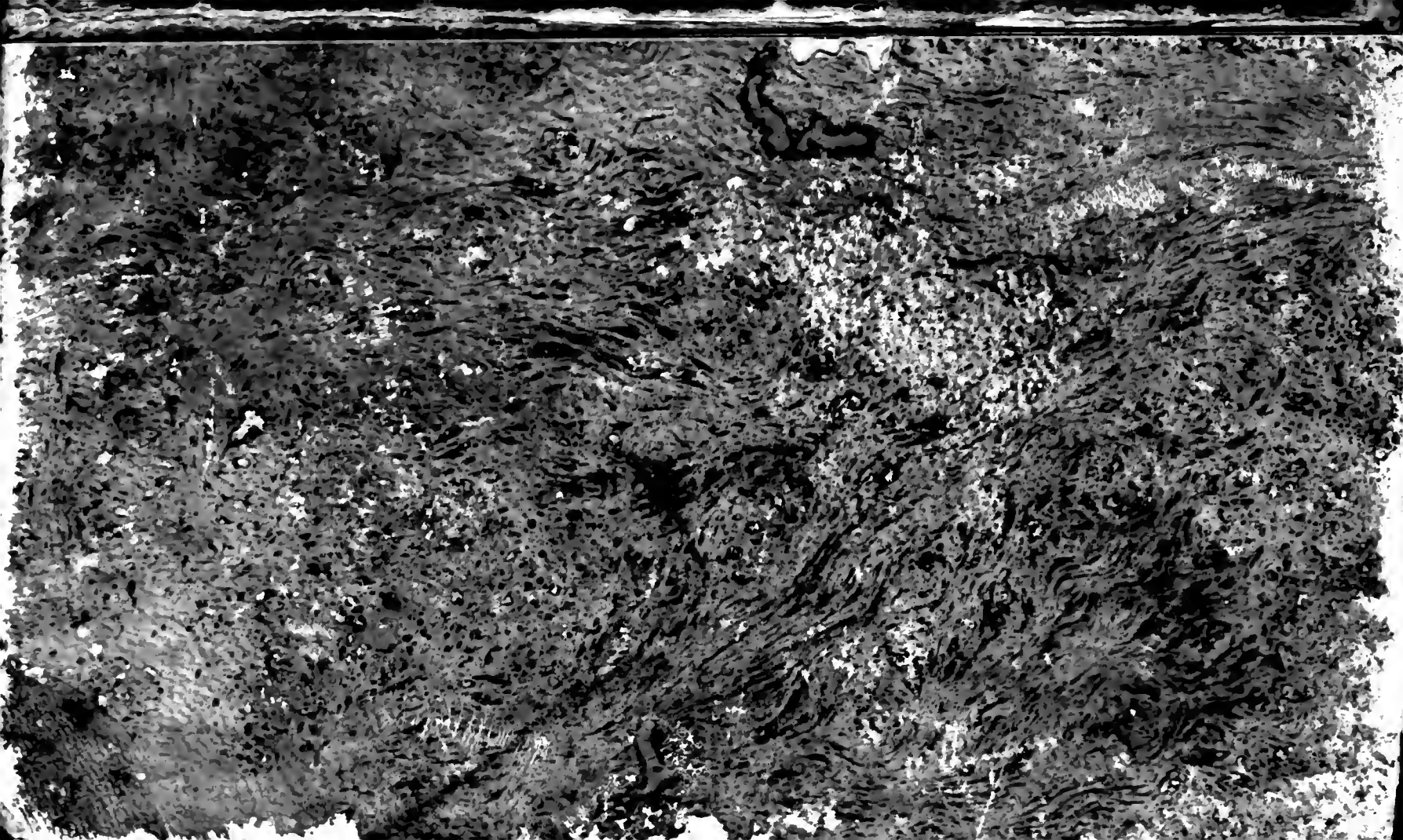

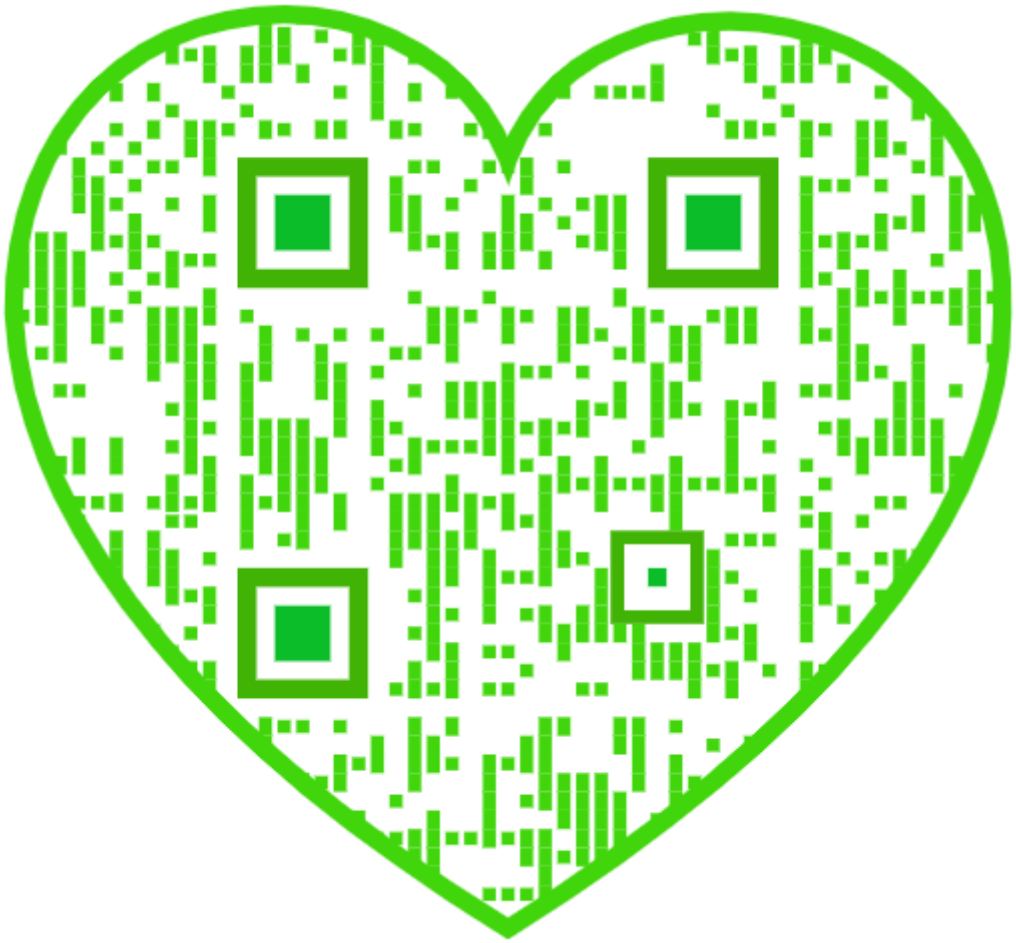

B. July 30, 1806.

A

PRACTICAL GUIDE

TO THE

MANAGEMENT

OF THE

TEETH;

COMPRISING

A DISCOVERY OF THE ORIGIN OF CARIES.

OR

DECAY OF THE TEETH;

WITH ITS PREVENTION AND CURE.

BY L. S. PARMLY,
DENTAL PROFESSOR.

"The great distress which usually accompanies, and the inconvenience which always follows the loss of the Teeth, makes the *discovery of some mode of prevention of caries very desirable.*" Fox.

PHILADELPHIA:
PUBLISHED BY COLLINS & CROFT,
NO. 73, MARKET STREET.
J. R. A. Skerrett, Printer.

To BENJAMIN WEST, Esq.
President of the Royal Academy of Arts, &c. &c. &c.

DEAR SIR,

In addressing this small performance to you, my intention is less to congratulate you on the fame your unrivalled talents have secured to you in a department of the Arts, demanding all the finer powers of taste and genius, than to mark my high esteem for your private character as a man, in which the union of those virtues that diffuse happiness in the various relations of domestic life are so eminently conspicuous.

I have the honour to be,

Dear Sir,

Your very obliged

humble Servant,

L. S. PARMLY.

BUCKINGHAM STREET,
ADELPHI.

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PREFACE.

In submitting the following sheets to the attention of the Public, the Author feels it necessary to apologize for occasional inaccuracies of style; which the circumstance of his being a foreigner, combined with his anxious desire and impatience to make known some important discoveries, has rendered it as difficult for him to avoid, as it has afforded him but little leisure to correct.

The teeth, it is well known, are organs most important to the animal economy. Their use in conveying distinct articulation, in ministering to the comfort, or promoting the health, of the individual, is too obvious to be insisted on. Suffice it to observe, that when, from disease or accident, impediments arise to the discharge of their proper functions, calamities most mischievous to the

system ensue; every medical man knowing that imperfect mastication is a fruitful cause of many disorders the most distressing, dangerous, and even fatal to the human frame. Numerous have been the publications of able and skilful men, who have preceded the Author in this path of science. It is however melancholy to reflect how little that is really useful, has accrued from their labours. Experience evinces that all their instructions are but ill adapted to answer the intended purpose. Diseased gums, offensive breath, deficient and decayed teeth, are still objects of public notoriety. Conscious therefore how much remained to be accomplished, in every thing relating to the management of the teeth, the Author was induced to direct his attention very early to the subject; and the result of many years close application and study, has been attended by a discovery the most important that has yet been made in this branch

of physiology. Regulating his practice by the principles of his own system, he has now the pleasure of announcing to the public, the signal success that has marked his professional career in various parts of the world, and more particularly in this metropolis. Testimonies, as numerous as they are highly respectable, will satisfy the most incredulous, that these are not the pretensions of an empyric, and will convince those desirous of placing themselves under his care, of the decided superiority of his mode of treatment in every possible case of diseased dentition, and under every variety of age, constitution, and habit of his patients. He also undertakes to initiate the youth of both sexes, without any laborious process, in the dental art, so as to enable them to preserve these important organs in a perfectly sound and healthful state, to the most protracted period of life.

Wherever, in the following work, the Author has ventured to criticise either the opinions or practice of his predecessors, he can truly say, he has been influenced by no other motives, than a wish to promote the improvement of an art but too little studied, and to excite the attention of the public, and the minds of professional men in particular, to its importance. Where their sentiments appeared founded on just observation, he has willingly adopted them, and in doing so, he has not scrupled occasionally to borrow their language. Should what he has written, have the effect of rescuing only one individual from the sufferings incident to a neglect of the teeth, he will not regret the time the present publication has cost him.

Buckingham Street, Adelphi.

DESCRIPTION OF THE PLATE.

FIGURE 1. Rabbit Mouth.

2. Toothless Mouth.

3. Projecting Chin.

4. Mouth, without any deformity.

NUMBER 5. Mouth, expanded to shew all the teeth.

No. 1. 1. Front *Incisores*, } or Cutting Teeth.
2. 2. Lateral *Incisores*, }

3. 3. *Cuspidati*, Canine, or Eye Teeth.

4. 4. 4. 4. Two pair of *Bicuspides*, or small Grinders.

5. 5. 5. 5. *Molares*, or large Grinders.

6. 6. *Dentes Sapientiæ*, or Wisdom Teeth.

INTRODUCTION.

THE division of surgery into various branches, has, in a particular manner, served to promote the advancement of the science, and thereby been productive of the happiest benefits to society.

In examining the progress of the improvements in its different branches, it is to be observed with regret, that the *Dental Art* has not kept pace with many others of less real utility. One cause of this slow progress of dental science is, that the subject has not hitherto been considered as forming an essential part of professional education. Hence, the practice of it has generally been considered in no higher light than a mecha-

nical occupation or trade. A great improvement of this department of surgery, will depend on pointing out to society the importance of preventing diseases of the Teeth; and their connexion, in almost every instance, with the general state of the health, and preservation of the system.

Nothing can tend so much to accomplish this object, as an institution for the exclusive promotion of dentalogical science. The wants of society, as well as the disposition of the present enlightened period, so favourable to the universal diffusion of knowledge, demand such an institution; and such, we flatter ourselves, we are authorised shortly to anticipate, when this noble art will be rescued from that degraded state in which it has long remained in the hands of ignorant practitioners, or mercenary pretenders, who have in a great degree made it a monopoly. Within these few years, it must be admitted, that some attempts have been made at improvement; and the publication of the late Mr. Fox, joined with his regular course of lectures on this branch of physiology, has

done more for its promotion than the labours of any other individual, though occasionally some important errors occur, which it will be one object of the present treatise to notice and correct.

When we advert to the progress of medical and surgical science, during the last few years, we are struck with the rapid and beneficial changes which have taken place.

Medicine is now built on experimental science, and conducted by those enlightened principles which are the fruits of liberal education, and the peculiar spirit of the present times. The consequence of this has been, that the prejudices of the nurse, the mysteries of the empyric, and the pedantry of the schools, are completely done away.

In surgery, the same fortunate improvement is conspicuous; the complicated practice of former times now yields to a mild and natural proceeding: and such is the advancement of this branch, that operations are daily performed of that bold and decisive nature, that at a former period, would

have been deemed impracticable, and beyond the power of art to accomplish.

This general state of improvement in surgery gives great encouragement to the extention of the dental art.—Were mankind sufficiently acquainted with the many diseases and painful afflictions which originate from want of attention to cleanliness of the mouth; and were they convinced, that, from this cause alone, numbers drag out a life of distress, they would feel a greater curiosity, and take a more lively interest in obtaining information respecting an art, which the considerations of appearance, comfort, and health, render so essential. That such an interest has not been felt is the more astonishing, since we cannot but observe how anxiously solicitous the mind daily discovers itself to be on subjects of less importance. Indeed, mankind, in general, are not sufficiently impressed with the utility of improvements, till their own feelings convince them of their necessity. In the present instance, the truth of this observation is but too obvious; for, in most cases, it is either the loss

of Teeth, or the sensation of pain that induces people to pay attention to cleanliness of the mouth.

Though, at every time of life, an attention to the teeth is necessary, for their appearance and preservation; yet there are certain critical periods at which we are irresistibly led to the contemplation of the subject.—Infancy is one of them: when the teeth successively appear, the constitution of the child suffers from their protrusive power, and a general irritative action pervades the system; the sleep is disturbed, the appetite suffers, the bowels are deranged, the muscular flesh decays, and marks of universal sympathy affect every part. The anxious day and watchful night then give importance, in the opinion of mothers and female attendants, to this part of the human structure; and it is then that the greatest mortality of infancy occurs. It is computed, that no less than one-fourth of the human race die under two years of age, and it is clearly connected with this source; for the enlarged state of the nervous and vascular system gives a predisposition, at this

dawn of life, to inflammation and disease from the slightest causes. The next period that calls the attention to the teeth, is the time of shedding the temporary set. The habit now more firm, does not suffer the same general uneasiness as at the former period; but the process of nature, often imperfectly performed in the removal of the original set, requires to be assisted, in order to prevent that local deformity or disfiguration of countenance and features, which is well known to arise from this cause. Hence, this is a period to be earnestly watched by parents and guardians, especially when entrusted with the care of females, if personal advantages are to be studied and a pleasing exterior preserved. The last period of particular attention to the teeth is, when they begin to decay; for not only do they give exquisite pain, as the feeling of tooth-ache convinces, but the cause which moulders them away, like other species of gangrene, affects the contiguous parts, taints the breath, and causes the fetor of the mouth to be disagreeable, even to the individual himself. Thus

daily experience proves, that the teeth are generally the subject of pain and disease; and the question to be considered is, whether this state be naturally entailed upon them, or results from our own imprudence and neglect.

From the moment that the teeth have protruded, and appear in their proper situation, they are liable to be acted upon by every article of aliment that remains upon them : to protect them against this action, they are covered with an exterior coat, termed the *Cortex Striatus*, or enamel, different from other bone, and the structure of which constitutes their ornament as well as their defence.—While a strict attention is paid to cleanliness of the mouth, this enamel will be a sufficient protection against the operations of every external cause.

The teeth of the savage are generally sound and regular, and no accumulation forms to deface them. But this is different in civilized society; refinements in the culinary art give the food a greater tendency to acquire noxious powers, and form chemical combination.

This is displayed by the formation of that extraneous matter, called tartar, which, as it accumulates, seperates the teeth from their chief support, the investing membrane of the gums, and thus loosening them in their sockets, exposes them, and produces inflammation.

But a more active cause of the premature loss of the teeth, is the accumulation or lodgment of food in their interstices. There the putrefactive process commences, acts upon the enamel and penetrates to the bone.* In this way the tooth becomes gradually destroyed, and the individual suffers successive inflammation and pain for a time, till this active monitor, that leads to attention in all

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* The Author is aware, that most of his predecessors who have written on this subject, and among the rest, the celebrated Mr. Fox, have given a different Theory of Caries, supposing that it commences in the internal part of the tooth, and at length extends its ravages to the enamel.

For further information, however, on this subject, the reader is referred to the chapter on Caries.

cases, speaks in a language not to be misunderstood, the mischief of neglect.

If cleanliness be essential to other parts of the body, it is peculiarly necessary with respect to the mouth, through which is the opening for carrying on the two great processes essential to continuance of animal life; the process of digestion, which gives nourishment and support to the system; and the process of breathing, which conveys a principle from the air connected with vitality. If, then, the food, from uncleanliness of the mouth, be tainted in the preparatory step of mastication, the process of digestion must introduce into the system a tainted chyle, pregnant with the seeds of putrefaction; if the air inhaled receive the same impregnation, which is the opinion of some of the most skilful of the faculty, it cannot animate the body or give vital energy in a proper degree. These effects, which are independent of its injury to the teeth, have never been sufficiently appreciated. Thus, in all cases of unclean teeth, a putrid matter is daily passing into the body, and acting as a slow and unseen

poison for months and years, on every part of the frame. When this is reflected on, can there be a stronger inducement to clean the teeth in a regular and proper manner, as a preventive of general disease?

The more we examine the structure of the human body, however varied and multiplied its parts, the more we are struck with the intimate connexion of each part with the whole. Numerous as they are, to each is assigned some peculiar and needful office, and in a healthy state, the most perfect harmony subsists between them; no one obstructs, but each assists, the operation of the other, and thus promotes the ultimate preservation of the whole. By this wise adjustment, there is no schism in the body, no separate or interfering ends are pursued by the multiplicity of members, but the safety and support of each are the undivided care of all. Hence, in this view, there is no part of the frame that is not of importance, however trifling or insignificant it may appear; the most vital, as well as those on which the lesser energies

of the system depend, are equally essential to life and its comforts.

On these considerations, the teeth certainly claim an important rank in the human structure: for—

1st. On them depends the proper expression of the countenance. By their removal the character and symmetry of the face is lost, and beauty is thus deprived of its chief attraction. The celebrated Lavater has paid particular attention to this subject in his work, and pointed out their effect and importance in delineating the features of the mind. From this effect on the features they call for more particular attention on the part of females; for (to use a quaint expression) no woman can be beautiful "in spite of her teeth;" and when the mouth is deprived of this ornament, the countenance loses its principal charm.

2ndly. To the teeth also is assigned the chief power of enunciation. If the great and pre-eminent prerogative of man is the possession of speech, that speech can never be complete or perfect, without the teeth to mo-

dulate the sound, and give proper utterance to the words. Hence, when the teeth are lost, the speech becomes imperfect and scarcely understood. This circumstance gives them additional value, particularly to a man in public life; and the preservation of the teeth ought to be one of the first objects to those who wish to shine either in the senate, at the bar, or in the pulpit. Without these instruments of utterance, the graces of their eloquence are lost, and the power of affecting the mind and convincing the understanding, if not taken away, is considerably diminished.

3dly. It is the loss of this part of the structure, that produces the leading mark of age, and occasions the contracted countenance, the wrinkles of the face, and those unseemly changes which youth and beauty ever wish to see placed at a distance.

4thly. When the teeth are neglected, they frequently assume a preternatural growth, which produces a disagreeable change on the countenance; and this, of itself, should be a sufficient inducement to their frequent in-

spection, where external appearance is considered of any importance.

5thly. But the most dangerous effect of neglect of the teeth, and their consequent loss, is the imperfect mastication of the food, which occasions indigestion, and a variety of disorders depending on this cause. In order to a proper digestion, it is necessary that the food be sufficiently comminuted by the action of the teeth, while, during this action, it becomes blended with a certain quantity of saliva; thus rendering its solution easier when it descends into the stomach to be mixed with the gastric juice. Where the teeth are wanting, the food can neither be properly divided or broken down, nor a due quantity of saliva elicited from the glands, to render its solution in the stomach complete for forming it into perfect chyle.

6thly. A disagreeable, though not a dangerous, effect from the neglect of the teeth, is an offensive breath: this fact is susceptible of demonstration by positive experiments, one is, that the breath, which is exhaled by the nostrils, is widely different from

that which is expired through the mouth of a person with diseased teeth and gums; fœtid breath therefore is confined entirely to the state of the mouth, and has no connexion with that of the stomach, or the digestive organs, as is erroneously supposed:—eructatation or belching can only produce a temporary effect; but, from uncleanliness of the mouth, we find the taint constant and habitual; and, unless the cause be eradicated, all the spices and perfumes of the east, though they may conceal, cannot remove it.

7thly. Besides the reasons already assigned, for the necessity of a strict attention to the teeth and gums, may be added their great influence on the state of the general health.

The danger to the lungs from constantly inhaling a putrid effluvium, has been strongly commented upon by the faculty, as a leading cause of pulmonary consumption. When the great annual mortality from this disease is considered, we cannot doubt that this putrid matter may so change the nature of the fluid inhaled, as to cause that slow in-

flammation of the lungs, productive of those tubercles which are the foundation of the disease.

The teeth may be considered, in some measure, as extraneous bodies; and thus do not, like the other parts of the human frame, possess the power of freeing themselves from whatever is injurious. The importance therefore of an acquaintance with the dental art, as a part of education appears indispensable, is the only means by which this department of science can be enabled to take that rank, which its importance in promoting the health and comfort of mankind so imperiously demands. Nothing will be a source of greater satisfaction to the author, than that his humble efforts should be instrumental in effecting so desirable a purpose, by impressing on the minds of parents and guardians, the necessity of the care and management of the teeth as a primary duty, with a view to the entire prevention of dental disease and deformity. If begun in childhood, and continued in the regular manner recommended, no accumulation could be formed.—The pre-

vention of dental disease is founded on an important discovery of the author: experience has satisfied him fully of its success; and this experience makes him more eager to impress the same conviction on others. If to vaccination we owe, of late years, a decrease of the annual mortality, a point clearly proved, the prevention of dental disease will add to this decrease; for the constitution will not be worn out, and the health impaired, by sleepless nights and days of tormenting pain from dental irritation, as happens to too many who date the first symptoms of their ill-health from this cause.

It has been a common opinion, that the teeth are intended by nature to decay sooner than the other parts; but this opinion is erroneous. Their premature decay is the consequence of neglect; and neglect acts here in the same manner as in other cases, by sapping the vital energy of the part, if we may use the expression, and thus occasioning them to moulder away.

After these observations on the importance of the care of the teeth, and as a preliminary to the present work, it may be proper to take a general view of the organized structure of man.

A

GENERAL VIEW

OF THE

BODY.

THE body is composed of a solid and fluid part, mutually dependent on each other: the former gives it stability, form, and the powers of action; the latter supplies the waste, which the solid parts necessarily undergo in the prosecution of their functions.

The solid part has been divided by anatomists into the head, chest, *abdomen*, and extremities: the first contains that organ,—the brain, which is the origin and seat of life and feeling; it is enclosed in a case of bone for its greater defence and security, and is thus equally

screened from heat and defended from cold. This part is further covered and beautified by an extensive and constant growth of hair; and to the most prominent part of it, the face, is assigned the situation of the different senses which guide and regulate the actions of the body. The chest contains the principal organs which give to the nourishment the peculiar changes that make it pass from a fluid to a solid state, and convert it to supply the decay of the solid parts: of these organs, the principal are the heart, the lungs, and the liver.

The *heart* is that strong, indefatigable muscle, by which the blood or vital stream is conveyed to every part; it is enclosed in a membranous bag, the inner surface of which is lubricated by a thin exhalation to allow it its proper play: it possesses two separate cavities. Each cavity contains an auricle and a ventricle.—From the right ventricle the blood passes into the lungs by means of the

pulmonary arteries, and is again returned to the left cavity of the heart by the pulmonary veins. From the left cavity it passes into the *aorta*, to be transmitted to every part of the system; after this, it is received into the *cava*, and returned to the heart to undergo the same process. Thus, the blood constantly circulates in an interchangeable tide, whether asleep or awake, and knows no intermission in its flow. Through the arteries it sallies briskly, and returns more slowly through the veins. The action of the arteries evolves the heat received by the lungs, and contained in the blood for the animation of the body: this heat we find increased by whatever augments the velocity of the circulation, and lessened by whatever renders it languid.

The *lungs*, the next important organ, receives the blood from the heart, to draw a new principle through them from the air, and to return this principle into

the circulation, to be dispersed to every part, conveying increased animation and life: they consist of two divisions, one on each side the chest, and they open to the throat by the *trachea*, or wind-pipe.

The *liver*, the largest gland of the body, is situated in the *abdomen*. Through this gland all the blood circulates, in its return to the heart, after that principle is expended, which it receives from the lungs. This organ secretes a peculiar fluid, the bile, of great use in the animal economy; and often, by its accumulation, its deficiency, or obstruction, is the source of numerous and serious maladies. The gall-bladder is appended to it as the reservoir of that secretion.

Besides these, some of the lesser or secondary organs may be noticed. The kidneys, two small glands situated between the back and loins; the spleen, for forming the red globules of the blood, or some other important use; and the

pancreas, secreting that fluid, termed saliva, which assists mastication, and moistens the mouth.

These divisions of the body are covered partly with bones and cartilage, forming a regular arch, gently moveable in respiration, which protects the chest, and partly with a fine membrane, the *omentum*, and with muscles, which enclose the contents of the *abdomen:* these parts are appended to the back bone, which sustains the weight of the whole structure, and serves also to form a conveyance to that elongation of the brain termed the spinal marrow, which gives out part of those fine cords or nervous filaments, that give sensibility to the system.

The last division of the body is the extremities,—the arms, the hands, the thighs, the legs, and feet. The arms are pendent on either side, proportioned to each other, being the guards which de-

lend, and agents which serve, the whole frame; fitted, by their shape and structure, for the most diversified and extensive operations, and capable of performing, with singular expedition and ease, all manner of useful motions.

The hands consist of numberless small bones and muscles, forming a nice and varied mechanism, capable of assuming many shapes, and performing every useful service.

The lower extremities show the same peculiar adjustment of structure for the office intended by them. The thighs and legs are articulated in such a manner, that they administer most commodiously to the act of walking, and do not obstruct the easy posture of sitting. By assuming a gentle projection, they undergo a diminution of bulk, and acquire a more graceful form.

The feet, the last part of the extremities, compose a firm and neat pedestal, far beyond what statuary or architec-

ture can ever accomplish. This pedestal is capable of altering its form, and extending its size, as different circumstances require. It contains a set of active springs, which tend to place the body in a variety of graceful attitudes, and qualify it for a multiplicity of advantageous motions. The undermost parts of the feet are covered with a sinewy substance, preventing that undue compression of the vessels which the weight of the body, in standing or walking, might otherwise occasion.

Such are the four principal divisions of the body; but a part of the structure we have hitherto omitted: it is the one by which the aliment is received and prepared for being introduced into the body, to supply the waste that daily and hourly takes place.

This part begins with the mouth; containing, first, the teeth set in alveolar processes formed on the jaw-bones: the upper jaw consists of six pair of bones,

and one without a fellow, viz. *ossa maxillaria, ossa malarum, ossa nasi, ossa lacrymalia, ossa spongiosa inferiora,* and *ossa palati;* of each of these there are two: the thirteenth is a single bone called the *vomer.*

Ossa maxillaria.—These bones constitute the greater part of the upper jaw, of the nose, and of the roof of the mouth. They have many processes and depressions, which render their figure extremely irregular; by the union of which, and other bones, are formed the cavities called the maxillary sinuses. These cavities are situated beneath the cheek-bones, and are lined with a continuation of the fine membrane which lines the cavities of the nostrils and frontal sinus: this membrane is called the *Schneiderian,* from the name of its discoverer; and upon it the olfactory nerves are distributed. The upper sides of the maxillary bones form the lower and internal circumference of the or-

bits; and in their lower sides are the sockets for the teeth. They have several holes for the admission of nerves and vessels; the principal of which, are the *foramen orbitale externum*, the *foramen incisivum*, and the posterior *palatine foramen*, which admits the maxillary nerve to pass to the teeth. These bones are joined to the *os frontis* and *ossa lacrymalia* at the great angles of the eyes, and to each other under the upper lip.

Ossa malarum.—These are the prominent bones which form the cheeks: their figure is nearly quadrangular; they join the *os frontis* at the little angles of the eyes, their upper sides forming the lower and external circumference of the orbits. They are smooth and convex on the surface, and unequal and concave within. The internal sides join the *ossa maxillaria;* and the external sides are joined by long processes to the temporal bones, which union forms an arch called the *zygoma.*

Ossa nasi.—So named from their situation and use, forming the upper part or bridge of the nose: they are thin bones, of an irregular, oblong, square figure, externally convex and smooth, and internally concave and rough. They are joined above to the frontal bone--below, to the cartilages of the nose--behind, to the maxillary bones—in front, to each other—and are supported internally by the partition between the nostrils, called the *septum narium.*

Ossa unguis, or *lacrymalia.*—These bones bear some resemblance to the finger nail; from whence their name *unguis:* they are also called *lacrymalia*, from the water of the eye passing over them into the nose. Their situation is in the great angles of the eye, separating the orbit from the cavity of the nose. Their surface, next the eye, is concave, and forms part of the orbit on which the eye-ball moves. They join above with the *os frontis*—below, with the

maxillary bones—and, internally, with the ethmoid bone.

Ossa spongiosa inferiora, are so called from their spongy texture.—These bones form part of the nose, enlarge the surface, and extend the organ of smelling; they also assist in forming the under part of the lacrymal duct, the orifices of which into the nose are concealed by them.

Ossa palati are bones of a very irregular figure.—They form part of the roof of the mouth, of the nose, and of the orbits. The portions which form part of the palate are irregularly square and concave; and, though thin, are firm and strong:—they have many processes which joins the other bones of the face.

The *vomer* has its name from the resemblance it bears to the ancient ploughshare: its situation is in the middle of the lower part of the nose, of which it forms the partition. This bone is smooth,

thin, and of a solid substance; it enlarges the organ of smelling, by allowing space for expanding the membrane of the nose.

The lower jaw is admirably adapted to the necessity which exists for a great variety of motions, combined with strength of action; it is, at first, composed of two bones,—the ossific fibres of which unite with each other at the chin, soon after birth, and, by complete ossification, become one bone; this union is called *symphysis*.

This jaw is formed of two *laminæ*, whose surface is hard and smooth; its internal substance is cellular: its base thick, compact, and hard, particularly at the chin, where it is most exposed to injury. It has two processes on each side; the anterior of which, called the coronoid processes, end in points which pass under the *zygomatic* arches. The temporal muscles are inserted into these processes. The posterior processes, call-

ed *condyloid*, or articulatory processes, are thicker and less elevated than the coronoid processes; they terminate in oblong, smooth *condyles*, or heads, supported by a cervix. To each *condyle* is attached a strong moveable cartilage, which is also attached to the cavity and eminence, which are for that purpose in the temporal bones; they are further strengthened in their situation by a strong ligament attached to the temporal bones, and to the cervix of the *condyles* on each side. Thus, the under jaw is firmly united to the skull; the loose intervening cartilage greatly facilitates its lateral motion, so necessary in mastication. The lower edge of this jaw is called its base, and the end of its base is its angles. In this bone are four holes; two internal, near the processes; and two external, near the chin: by the internal holes enters a branch of the fifth pair of nerves, an artery from the *carotids* and vein from the *juglares*, branches of which

pass into the fangs of the teeth; these vessels emerge again by the external holes, and spread upon the chin. That part of the bone in both jaws, which immediately surrounds the fangs of the teeth, is called the alveolar process.

The growth of this process commences with that of the teeth, and advances with them to maturity.

The existence of the teeth and alveoli, so entirely depend on each other, that the loss of the former, is inevitably followed by the waste and absorption of the latter. Thus, the jaw bones of persons become toothless through age, have no sockets for teeth, but have a smooth and solid surface.

The teeth are so formed as either to tear or grind, according to the nature of the aliment presented to them; which being masticated, is received on the tongue, that, without the assistance of either bone or joint, adapts itself to every shape and posture, for the purpose of introducing

the food. This important organ also renders our thoughts vocal, enables us to communicate our sentiments, and by this faculty of speech, qualifies us for all the comforts and benefits of society. The tongue is terminated by the throat, containing the passage to the lungs, through which we breathe; and the passage to the stomach, or gullet, by which we receive food. The stomach, the reservoir of the food, may be considered as its dilatation. In its figure, it resembles the pouch of a bagpipe, and has two orifices; the one which receives the crude aliment from the mouth, and the other which conveys the digested food, or chyle, to the upper part of the intestines. The food on being received into the stomach, undergoes an important chemical change: the solvent fluid of the stomach, secreted from its coats, termed the gastric juice, acts upon it; and by the further assistance of heat, it is converted into chyle. This chyle is drawn off by

all the secretory orifices of the lacteal vessels, spread on the surface of the intestines; and the useless part separated, and receiving an admixture with the bile and other active fluids, is discharged under the form of feculent matter, after passing through the long and intricate convolutions of the cavity of the intestines.

Thus, is the body supplied with food, and its waste repaired. For the choice of this food we are indebted to the senses, which are five in number, viz. the sight, the hearing, the smell, the taste, and the feeling. The eyes, which are the organs of vision, are placed in the upper part of the face, are of a globular structure, and consist of simple fluids enclosed in thin tunicles. These tunicles are furnished with an apparatus of muscles, enabling them to perform all the varied motions of which they are susceptible. This power, combined with its elevated position, renders the sight

the most extensive of all the senses. It is through this sense only, that we are made capable of enjoying the sublime and most beautiful in nature and art. In sleep, its exercise is suspended, and the lids, those natural curtains, spontaneously close for its protection, till the light of day again calls forth its active powers.

Next to the sight is the hearing; and the organ subservient to this, consists of an outward porch, the external ear, and an internal apparatus of the most admirable contrivance and workmanship. The hammer, the anvil, the stirrup, and the drum, are the names of its parts; the winding labarynths, and the rounding galleries, with other pieces of its mechanism, are all formed to increase the power of hearing, in a manner curious and intricate beyond description. It is through this sense the charms of music are enjoyed, and social intercourse maintained. While the eye is

watchful only in our waking hours, the ear is expanded to receive impressions at all times, and to warn us of danger before its approach. So important are the organs of sight and hearing in the estimation of nature, that she has shewn her anxiety of guarding against their accidental loss, by bestowing duplicates of each.

Smell, the next sense, is one through which also we receive much enjoyment. It has its seat, a fine set of nervous *congeries*, spread every where on the internal surface of the nose. Through this sense we inhale the flowery breath of Spring, the scent of autumnal fruits, the delights of the hay-field, the fragrance of the orchard, and the more delicious odours of the garden-rose.

Taste, the next sense, has its residence in the tongue and palate. Like a friendly monitor, it apprises us of the safety or mischief of what we eat or drink, and, with the vigilance of a sen-

tinel refuses admission to any article of food till its qualities have been subjected to its scrutinizing test.

The last sense, the touch, is seated in the skin, or that covering which envelopes the whole body; it possesses, therefore, a wide range, and is not circumscribed to a particular place, as the others are. The skin is formed of the most delicate net work, whose texture is exceedingly minute, and whose threads are multiplied even to a prodigy: they are so minute, that nothing passes them which is discernible by the eye, though they discharge every moment what constitutes insensible perspiration. The threads, indeed, are so multiplied, that the point of the smallest needle cannot pierce a single part without causing an uneasy sensation. The outermost covering of the skin is that soft whitish tegument, raised by a blister, termed the cuticle or scarf-skin. The true is that reddish and exquisitely tender part

which appears beneath the blister when broken. The former is void of sense, and intended to screen the true skin from the impressions of the air, and the effect of injuries. The colour of the cuticle is white. The apparent black or brown it acquires in the Negro or Indian, is entirely owing to the mucous substance lying under it.

The functions of the skin are extensive and important. It is the seat, as observed, of the sense of touch; it is the channel of perspiration, and it observes a sympathy with the internal parts; so that an intimate relation subsists between them, and a derangement of the internal organs is always manifested by the state of the skin: hence the countenance is a sure index of disease; and nature has intended this change, in order to give us alarm in the first instance, and warn us of danger: but the sense of touch is more exquisite in the points of the fingers than

any other part. Both the fingers and toes are furnished with the defence of nails, which are now considered as a continuation of the cuticle, as they are removed with it by boiling water or maceration. Like the cuticle, they are insensible, are renewable when separated, and have no evident vessels: but they differ from the cuticle in structure, being formed of plates with longitudinal fibres, closely compacted; they begin by a square root, a little before the last joint of the fingers and toes; in their appearance, when separated, they are transparent as horn; but in the living body are coloured by the vessels of the skin, to which they adhere, and from which they derive nourishment:—they are fixed at their root to a semilunar fold of the skin, and are there covered by a reflexion of the cuticle, which firmly adheres to them. Their growth proceeds from the roots, not the points: by them the ends of the fingers and toes are

strengthened and defended. In the fingers they increase the power of apprehension, particularly in laying hold of minute bodies.

The skin is also adorned in certain parts with a foliage of hairs: they arise by roots or bulbs from the cellular substance under them. The bulbs are of various shapes in different parts of the body, and have blood-vessels dispersed upon them for their nourishment. Each of the bulbs has two membranous capsules, containing an oily fluid between them, which gives colour to the hair; for want of this in age, or under certain diseases, the hair changes its colour. Each hair consists of smaller hairs inclosed in a membrane, and is somewhat like the nature of the nails. Like them, it grows from the roots. Though all the uses of the hair are not yet known, it evidently serves for the warmth, protection, and ornament of those parts, on or near which it is placed.

Such is a general view of the complicated and varied structure of man. When we contemplate the nicety and art with which every part is constructed, we should suppose it was intended to last for ages: experience, however, daily teaches us the reverse; and that certain parts giving way, and falling into decay, occasion the destruction of the whole machine.

The teeth, though the hardest parts of the human frame, and intended by nature to survive every other, are, through neglect and mismanagement, the soonest which give way. The nature and diseases of these organs are what we are now to consider as the subject of the present volume.

OF THE

FORMATION AND STRUCTURE

OF THE

TEETH.

THE teeth consist of two parts: osseous matter, the same as other bone; and enamel, their peculiar covering, which gives them their whiteness and polish of surface. Each tooth may be properly divided into three parts.

First,—The crown, or that part which projects from the gum, and is the only division which possesses the covering of the enamel.

Secondly,—The neck, or that part where the enamel immediately termi-

nates, and to which the gum is closely attached.

Thirdly,—The fang, enclosed by the socket, and inserted deeply into the jaw.

At the point of the fang there is a small opening, placed for the passage of nerves and vessels, which are ramified or spread out on the lining of the opening within the tooth. In this manner the circulation and sensation of each tooth are supplied. The fang is, therefore, an important part, and of the same value as the root to vegetables; preserving the tooth in its due position, and, at the same time, conveying to it the proper degree of nourishment.

Man differs from other animals in being provided with two sets of teeth: the first intended for the period of infancy, and consequently limited in their duration; the second intended for the remainder of life, and, therefore, of a stronger and more compact texture. The

teeth, in their first formation, unlike other bone, instead of having for their base cartilage or membranous substance, are formed from a soft pulpy matter resembling their shapes, and may be distinctly seen at the time of birth. As soon as they have attained their shape, grooves are formed, into which the surrounding vessels deposit the pulpy matter, constituting the rudiments of the future teeth.

At the age of five or six months, this pulpy matter has a regular arrangement, and is enclosed in membranous sacs or bags, ten in number, in each jaw, corresponding to the number of the temporary teeth. This first appearance is succeeded by ossific fibres shooting across, and dividing the sacs into their respective compartments, which are the commencements of the future sockets. About the seventh month, the ossification commences, both on the cutting edges of the first teeth, and on the pro-

minent points of those situated further back in the jaw.

At birth, the bodies of all the first set appear distinctly formed in each jaw; but, at this time, they are ossified only on the external parts, and the unossified pulp within is merely covered with a shallow bone. As the teeth proceed in their ossification and shape, the investing membranes adhere more closely to their necks; and by this attachment they secrete and deposit over the crowns of the teeth a fluid, from which a very white substance is deposited upon the bone. This is the enamel, which is at first of a consistence not harder than chalk; but in age it acquires such a hardness, that a file in cutting it, is soon worn smooth.

After birth, the growth of the teeth is rapid, and cannot, therefore, be confined long within the alveolar cavity or socket; they lengthen chiefly from the bodies; those of the under jaw downwards, and

those of the upper jaw upwards. The parts that first lengthen are shaped into fangs; and, as *this takes place, the sockets grow round, and more closely invest them.* On the progressive ossification of the teeth, their original membranous coverings undergo the process of absorption, and are carried out of the system, having completed their original and destined purpose. In the progress of this growth of the teeth, a corresponding growth takes place in the sockets or alveolar plates; at first, they grow much faster than the teeth themselves, which are consequently, but loosely, contained in them; and this rapidity of growth is necessary, both to render the soft gum capable of sustaining pressure, as well as to protect the embryo teeth from injury. Hence, in the mode of their growth, it may be observed, that the outer edges of the sockets or plates grow higher, and turn a little over in order to approach each other; the gum then

hardens over;—and thus the teeth are fully protected, and the gums rendered sufficiently firm to undergo every necessary degree of pressure.

The protrusion of the first set of teeth begins as early as at the end of four or five months after birth, though in this there is a considerable variation; nor does this variation depend on the strength or delicacy of the child; for we often find that delicate children commence dentition very early; while, on the other hand, strong children are very slow in acquiring their teeth: nay, there are some instances where children have shewn no appearance of teething until the fourteenth or fifteeth month. The general rule, however, is, that their protrusion begins from the sixth to the eighth month after birth: the mode in which they affect a passage through the gums, is by the process of ulceration. The teeth pressing on the membrane which encloses them, occasions its ab-

sorption; and the pressure being next continued on the gum, causes that also to give way.

The order in which the teeth successively make their appearance, may be thus described; first, the two front *incisores*, or cutting teeth, of the under jaw,—one generally appearing a few days before the other; for, though formed in pairs, they seldom protrude at the same time. In about a month after, those are succeeded by the front *incisores* of the upper jaw. Next follow the lateral *incisores* of the under jaw, and soon after those of the upper jaw. A deviation from the order, hitherto observed, then takes place; and, instead of the *cuspidati*, or canine teeth, which are next in succession, the anterior *molares*, or double teeth, appear in the under jaw; and these are soon after succeeded by those of the upper jaw. Then follow the large *molares* which completes the first or temporary set. The whole process

generally occupies a period of about two years and a half.

Though this is the regular course observed by nature, there are, at times, exceptions to this order of protrusion; for, instead of the front *incisores*, the lateral *incisores* are discovered first through the gums, and the small *molares* before the lateral *incisores*. It may be remarked, also, that children have been born with the two front *incisores* of the under jaw through the gum, but such premature birth is always imperfect; these teeth possess no fangs, and are attached chiefly to the gum, which occasions pain and irritation to the child: on which account it is generally found necessary to extract them.

The period of dentition is often highly critical to the constitution of the child, as it not only occasions disease, but generally aggravates any other disorder which may occur at the time; yet, it is well known, that this period sometimes

elapses unaccompanied by any particular symptoms of pain or uneasiness.

The appearance of the teeth is clearly an effort of nature, in which she effects the absorption of the investing membrane, the alveolar process, and the gums, to make way for their passage; but the teeth sometimes advancing too rapidly, occasion a strong tension and pressure on the vessels of the gums, which produces pain and irritation in the surrounding parts. Hence, the gums appear swelled and inflamed, a constant discharge of *saliva* takes place from the mouth, and often a general sympathetic fever prevails over the whole system.

At this stage of the fever, which frequently proves fatal, the treatment of the child, both as respects the parts affected, and the system in general, demands particular attention.

It is commonly recommended to allow the child some *hard substance* to press against the gums, which, though it may

afford a temporary relief, generally increases the inflammation and uneasiness. A more effectual means of relief would be afforded by producing a gentle friction on the gum, with the finger and a little fine salt; which, by exciting a copious flow of saliva, and thus reducing the action of the vessels, would tend to alleviate the inflammatory symptoms. But an early recourse to the lancet is the safest expedient, and the only one that is to be depended on. An incision made with this instrument over the tooth that is the cause of irritation, either in a linear or cruciate form, as the tooth is single or double, would not only administer instantaneous ease to the little sufferer, but would prevent or remove every distressing and dangerous symptom with which dentition is often attended. But little skill is required in performing so simple and safe an operation, particularly if the lancet, the author has invented for the purpose, be

employed. The operator must see that his instrument reaches the seat of the mischief; and not be satisfied with barely dividing the gum, but, also, the membrane below the gum, that is in immediate contact with the tooth. The division of this membrane, from its tougher texture, will acquire some little pressure of the lancet, (and, with the instrument commonly used, a considerable one,) from which it need not be apprehended the tooth can sustain the slightest injury.

And here I cannot but seize the present opportunity of combating the prejudice that so generally prevails in the minds of parents against the use of the lancet. Let them be assured, it is absolutely impossible the slightest harm can arise from its use, even when the operation is discovered to have been unnecessarily performed. When parents are even convinced of its necessity, their fears frequently induce them to postpone

the operation till fatal symptoms of convulsion appear, which frequently prove fatal, and in one moment awfully reproach their indecision, by hurrying their infant offspring to another world. But let not the most threatening symptoms of danger deprive the afflicted mother of her presence of mind, but let her apply immediately to the lancet; for the author has known many a child snatched, as it were, from the arms of death, when the delay of its application, even for a few seconds, he has the strongest reason to suppose, would have terminated their existence.

The general irritation of the system which attends teething, is marked by the following leading symptoms:

Flushings of the cheek and fever, which is generally sudden in its attack. The eyes of the child first become heavy: he is hot and restless, putting his hand often into his mouth. The tongue becomes white, the skin dry, and the ap-

petite and rest are disturbed. These symptoms become often so aggravated, that delirium succeeds, convulsions supervene, and a fatal termination takes place.

Where fever is not so predominant, diarrhœa is a common symptom, which, if gentle, is attended with beneficial effects, and assists in taking off the irritation; but when, on the contrary, it is violent, of a green colour, and attended with much griping, the child becomes exhausted, its rest is constantly disturbed, startings and convulsions supervene, and the termination is often fatal.

Another symptom of general irritation at this period is, the appearance of different eruptions on the skin. These are attended with considerable variety, and are often thought to arise from a different cause than that of teething; but the period of their occurrence marks their origin, and every remedy is found ineffectual, till the irritation of teeth-

ing is past.—Such are the symptoms which the protrusion of the first set occasions.

The permanent set, on the contrary, occasions no uneasiness or pain. These, like the others, are formed before birth; but, in the formation and perfection of this set, we may observe, a very important part of life is occupied; twenty years being necessary for their complete evolution. They consist, generally, of thirty-two in number; being twelve more than the primary set, and are divided into four classes, namely, eight *incisores*, four *cuspidati*, eight *bicuspides*, eight *molares*, and four *dentes sapientiæ*: if more, they are termed supernumerary teeth.

The formation of both sets of teeth correspond to the elongation or growth of the jaws, and the changes are exhibited in the following order: the temporary *incisores* and *cuspidati* of the child, are succeeded by larger ones of a similar form; while those which succeed the

temporary *molares*, are much smaller, and, being divided or irregular on their grinding surfaces, are called *bicuspides*. The adult *molares*, which succeed each other as the jaws advance in growth, all differ in the number and shape of their fangs.

The size of the teeth is originally determined by the deposition of ossific matter assigned them, so that, on their appearance beyond the gum, their growth may be considered as completed, for they neither increase in size nor alter in shape.

The first set, or temporary teeth, having answered their purpose, the permanent teeth, formed in sockets behind them, and which have been gradually proceeding in growth, by pressing forward, possess the situation of the others: and in this, they are often impeded by the roots of the temporary set, which have never been absorbed.

This effort, which facilitates the re-

moval of the temporary set, is one of the most curious operations of nature. The absorption takes place in the incisores about the fifth or sixth year, and proceeds in rotation, as the teeth originally protrude through the gums. The absorption is retarded by uncleanliness, and disease of the teeth and gums, which occasion irregularity in the permanent set.

SHEDDING OF THE TEETH.

THE changes which the teeth undergo form a very interesting part of Natural History; and is absolutely requisite to be known by every parent, to enable them to render such assistance, during the progress of the second dentition, as may prevent the permanent teeth from acquiring that irregularity which occasions so much deformity of the face, and often destroys correct enunciation.

The period when the temporary teeth begin to shed, is usually between the fifth and seventh year. On the removal of the front incisores of the under jaw, the permanent ones immediately succeed, and next the four first permanent molares appear; and then the permanent incisores of the upper jaw, which are suc-

ceeded by the lateral incisores of the under jaw, and soon after by those of the upper. The bicuspides are the next in order: first, the anterior ones of both jaws, and soon after the posterior ones; the cuspidati of the under jaw next appear; then the corresponding ones of the upper; and, near the same time, the middle molares make their appearance in both jaws, which is, generally, between the eleventh and thirteenth year; and, lastly, the posterior molares, termed dentes sapientiæ, or wisdom teeth. The time of their protrusion is more uncertain than the others; sometimes they appear as early as the eighteenth year, and at other times not before the fortieth year. Such is the time occupied by nature in the perfection of the permanent set of teeth; and such is the order in which they generally appear. Though the number of the second set is found to be thirty-two in all, yet a natural deficiency of them often occurs; but these

aberrations of nature are very rare: instances are even stated of persons not having any teeth; in such cases the gums are found sufficiently callous, and competent to every purpose of mastication.

Having thus described the two sets of teeth, it will be further necessary to consider, that part of their structure which is peculiar to these organs, and which qualifies them for the proper discharge of their office. This part is the *cortex striatus*, or enamel, which consists of a crystallization, formed by a soft earthy matter, deposited by the investing membranes on the bony layers of the crowns of the teeth. Its appearance, at first, is in fibres or streaks, running from the circumference to the centre of the teeth. As it hardens, these fibres arrange themselves into arches over the bodies of the teeth. Hence, by this mode of arrangement, arises its durability and strength, to resist, without injury, the

frequent actions to which it is exposed. The enamel, though thus so hard and strong, is not above half a line in thickness; but this thickness is increased on the cutting edges and grinding surface of the teeth; its hardness may be considered as tempered steel, and when struck against the latter it will emit sparks. The enamel, in many cases, appears imperfect; and where indented spots are seen on its surface, they may generally be attributed to uncleanliness of the mouth during the growth of the teeth. The enamel consists of three principles, viz. *phosphate of lime*, *carbonate of lime*, and *gelatine*, in different proportions. It is, at first, of a consistence not harder than chalk; though, when the teeth appear through the gums, it has acquired the firmer texture of bone; yet it is often so acted upon by particles of food and disease of the gums, as to assume a honeycomb appearance.

Having considered the formation and

progress of the teeth, to the complete evolution of the permanent set, it will now be proper to examine, not only the diseases to which, as organized bodies, they are exposed, in common with other bone, but also the disorders to which they become liable, from the peculiarity of their situation.

As diseases of the teeth not only injure the gums and taint the breath, but also affect the alveolar processes, their treatment should be undertaken only by an operator that is thoroughly acquainted with the principles of surgery.

Whatever affects the teeth, is readily communicated to their appendages; and hence, the alveolar processes and sockets, from their intimate connection, invariably become more or less diseased. The teeth, from the compactness of their structure, do not, like other bone, possess sufficient power to effect exfoliation, or the natural removal of disease; neither is it in their power to bring on the pro-

cess of suppuration, which nature employs as a salutary change to carry off the morbid effect that takes place; and when inflammation commences, if not speedily removed, occasions gangrene, or a death of the affected parts.

THE ADULT TEETH.

THE teeth may be viewed, in some degree, as extraneous bodies, not liable to those diseases which affect the rest of the system. This has not been duly considered by preceding writers, who have generally supposed these substances to be affected by all those circumstances which influence the rest of the body, and which are here, on the contrary, from the nature of their composition, of no effect whatever. The diseases of the teeth are simple; and they are only changed by that chemical agency which is immediately applied to them, and which never fails, when exposed for any length of time to its influence, to produce an erosion of their enamel. The adult, on the discovery of a carious

tooth, may date the mischief even as far back as the period of childhood, when the means of prevention should have been administered.

Numerous are the causes of diseased teeth and gums, stated by writers; but these causes may be considered, for the most part, as ideal. It has been asserted, that climate has a considerable influence in this respect; that the inhabitants of warm countries have sound teeth, while those in the colder regions have diseased teeth. But this is contradicted by plain fact; for we find persons both with sound and diseased teeth in every climate, which shews it is not to that cause the disease is to be attributed. The same may be said of the luxuries of the table, in respect to sauces, acids, sweetmeats, &c. For the teeth, the hardest substance of the animal machine, can never be acted upon by the transient passage of certain articles of food and beverage into the stomach. The same

observation will apply to heat and cold, and to the temperature of substances taken into the mouth. This temporary influence can never, of itself, produce disease in the teeth.

To what then are the disorders of the teeth to be attributed? This is an interesting question; and one whose solution escaped even the penetration of those celebrated physiologists, Hunter and Fox. I esteem it, indeed, a most fortunate circumstance, that my attention was so early and closely engaged by an enquiry of such general importance: and I can now assure my readers, that the result of my labours, founded on the successful prosecution of a series of the most numerous and satisfactory experiments, few have had even an opportunity of making is, that *the relics of what we eat or drink, (without regard to its quality) being allowed to accumulate, stagnate, and putrefy, either in the interstices of the teeth, as is most commonly the case, or else in*

those indentures on their surface, favourable for the lodgement of food, is universally the cause of their decay, and generally of most other disorders, to which they are exposed.

The great and leading cause, therefore, of the diseases of the teeth and gums, is to be sought for in the exercise of their functions. Being the agents of introducing the supplies to the system, they must act on these supplies mechanically, and fit them for passing into the stomach; and, in doing so, part of that matter, of which the supplies consist, must adhere, and receive, if allowed to remain, that change which enables it to act upon, and erode their enamel and bone; and to contribute to that peculiar secretion on the teeth, known by the name of tartar, which is another cause of inflammation and disease of the gums.

This is the true source of caries, *or decay of the teeth,* which the two late eminent writers before-mentioned, find so difficult

to account for; and of which discovery I cannot help feeling a pride and pleasure in avowing myself the author; for I can, with confidence, assert, that if the teeth and gums are regularly cleaned with the dentifric apparatus, recommended by the author, no caries can possibly take place. This then is a simple and clear view of the subject, and the grand *desideratum* for retaining these important organs in a sound and healthy state, to the latest period of existence. The mode of cleaning the teeth, as usually performed, is to rub them with a brush and a preparation of tooth powder, or tinctures, (to which some great quality is ascribed;) but, in whatever way it is employed, the source of the evil still remains; *for the interstices and irregularities of the teeth afford a lodgement for whatever is taken into the mouth; and no contrivance* HITHERTO DISCOVERED *can, from these parts, remove the accumulation.*

After much experience and reflection

on the subject, I found it necessary to construct a dentifric apparatus, which is found to answer every purpose, and to obviate the defects in common practice. This apparatus consists of three parts, contained in a small case, with a dental mirror, fit for the toilet or the pocket.

The first part to be used is the brush.* It is made hollow in the middle, to embrace every part of the teeth, except the interstices; and thus, at one operation, the top, (a part hitherto entirely neglected) the outer and inner surfaces are completely freed from all extraneous

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* As public utility, more than emolument, is the object of Mr. Parmly, he has resisted the advice of his friends, in declining to take out a patent for his brush; he cannot, however, but submit it to the feelings of a well known Dentist, at the west-end of this Metropolis, how far sentiments of candour or justice can warrant him in affixing his name to this article, and assuming to himself the credit of the invention.

matter. The second part is the dentifric polisher, for removing roughness, stains, &c. from the enamel, and restoring to the teeth their natural smoothness and colour. The third part is the *waxed silken thread*, which, though simple, is the most important. It is to be passed through the interstices of the teeth, between their necks and the arches of the gums, to dislodge that irritating matter *which no brush can remove*, and *which is the real source of disease*. With this apparatus, thus regularly and daily used, the teeth and gums will be preserved free from disease; the use of powders, tinctures, &c. will be superseded; and the breath will not be loaded with that putrid effluvium, which, besides its public annoyance, is the cause of numerous disorders. Indeed, were persons sufficiently attentive to cleanliness of the mouth, diseases of the teeth and gums might be prevented, without the necessity of any painful operation, which

would contribute no less to the improvement of the features of the countenance, than to the promotion of general health and comfort. Having thus pointed out the simple and successful method of preserving the teeth and gums, and rendering the breath agreeable, we will now consider their treatment when in a diseased state, and rectify the practice of former dentists.

TREATMENT

OF

DISEASED TEETH AND GUMS.

THE means of prevention, pointed out in the preceding part of the work, appear at first sight, interesting only to those whose teeth are not yet attacked by disease. Where, however, it has actually commenced, and undergone the specific treatment adapted to its cure, the means of prevention, already insisted on, will be equally efficacious against any future attack.

The treatment of the diseases of the teeth constitutes an important branch of surgery; and it is proper and almost indispensable, that every person, and particularly parents, should have some acquaintance with the operations be-

longing to this branch, that they may form some idea themselves of what is proper to be done, and what may be reasonably expected from the person who denominates himself a professor of the dental art; individuals will thus be guarded against the exaggerated promises of empyrics, and form just expectations for themselves of what can be done for their relief and improvement. For, whatever experience and manual dexterity the dentist may profess, he can never perform miracles, or effect any thing more than is rendered practicable by the laws of nature, and a knowledge of the structure of the teeth and their appendages.

CARIES.

CARIES, or the decay of part of the teeth, arising from uncleanliness of the mouth, is the most frequent disease to which they are liable. It commences, generally, in the interstices and irregularities of the teeth, in the form of a small dark spot on the enamel, which, eating it away, passes inwards, and occasions a still more rapid decay of the bone, till the tooth is entirely destroyed. It has been a grand mistake with authors on this subject, that caries commences internally, and acts on the bony substance of a tooth. The enamel, however, may be considered at all times, the first seat of attack; though, on the bone, from its softer texture, it makes a greater and quicker havock than on the

outer crystallized covering, which, to the eye, appears oftentimes scarcely perforated.

The wasting of the bone thus deprives the enamel of its support, so that the least pressure, on masticating hard substances, causes it to break away, which exposes it to the action of every external substance; and then a cavity is discovered in a tooth which had been supposed, previously to this, perfectly sound. Mr. Fox, and other writers, observed, that one part of a tooth is not more liable to disease than another; but the very nature of the cause which produces caries, viz. the relics of the food lodging in the interstices, proves, that those are the parts in which diseases generally commence. The molares are usually more decayed than any other of the teeth. This arises not only from their being more neglected than those placed in the prominent part of the mouth, but, from their indented surface, affording easier

lodgements for food than the other teeth; and for the removal of which, my new invented brush is so well adapted. The caries, or decay often begins on those sides of the teeth which are placed in apposition to each other; and, from the nature of the cause, which acts by a putrefactive process, there is no doubt, that, among the sound teeth, any one which is contiguous to a tooth that is decayed, is the most liable to diseased action. The incisores of the upper jaw, are, also, very frequently affected in this way, while those of the under jaw are very seldom known to decay. Their preservation arises from the under jaw being more exposed to the action of the saliva, the solvent powers of which prevent the relics of the food from injuring the teeth. The first appearance of caries, in every instance, is, by a discolouration, as before noticed, of the affected part; and, when a decayed tooth is examined, the diseased part appears to be disposed in strata, the external

layers of which are most decayed, assuming a blacker appearance, and are rendered so soft as easily to be cut away. The next are of a harder nature, less discoloured, and gradually exhibiting a firmer texture, till we reach the part that is perfectly sound. When the opaqueness of the enamel indicates the attack of caries, if the tooth is sawn through, a brown mark will be discovered, extending towards the natural cavity.—It is in this direction the disease proceeds, and, on the cavity being exposed, the investing membrane, and its ramifying nerves and blood-vessels, discover inflammation, which is the cause of tooth ache. During the progress of caries, the internal part of the crown, from its softer texture, suffers most, and is, therefore, soonest removed, which causes the inside to appear excavated. When the whole crown is destroyed, the progress of disease seems somewhat suspended; and the fangs will often remain, for many years,

with little alteration, from the cause of the disease not having the same field to act upon as it had on the crown, which is always an exposed part; and the fangs will even continue firmly attached to the socket, without the least inconvenience.

Hence, persons seldom experience the pain of tooth ache, from what are termed stumps; for, by the disease destroying the body of the teeth, the investing membrane, and its blood-vessels, are removed, and the circulation to the fang is thus cut off.

Pain, therefore, from stumps, arises from their acting as extraneous bodies on the sockets; and thus exciting inflammation, which often terminates in suppuration.

It is surprising, that the cause of caries should have been so much misunderstood. Mr. Hunter goes so far as to say, that it does not arise from external injury, or from menstrua, which have the power

of dissolving part of a tooth, and that we may reasonably suppose that it is a disease originally arising in the tooth itself. This idea is acceded to by Mr. Fox, who expresses the same doubt and obscurity respecting it. But if we attend to the commencement and progress of the disease, it appears evident, that the cause is of an extraneous nature, as before-mentioned; that it first affects the enamel in one point, and that this point is in a situation most liable to be acted upon, by the relics of the food and beverage which, from heat and stagnation, undergoing a putrefactive fermentation, acquire a sufficient solvent power to produce disease. The proof that this is the true cause of caries, is evident from the fact, that those who daily and regularly clean their teeth, even in the common method, are not so subject to this disease, because less lodgement can then take place in the interstices, or elsewhere to act upon them.

Mr. Fox, therefore, following his predecessors, has bewildered himself on this subject, and lost sight of the true cause.

He ascribes it, in the first place, to a state of ill health, during the formation of the teeth, which renders them unable to resist the causes of disease. But this cause would extend equally to all the teeth, if it arose from a general weakness of the system. He next attempts to account for it, from a state of constitution connected with dyspeptic symptoms, or stomachic complaints.

But this cause, like the other, could only act by depriving the body of its due portion of nourishment, and the teeth of course as a part: to this must be ascribed, the pearly white appearance, he remarks on them: but it never could induce a specific action on particular teeth, the leading point contended for. Certain kinds of diet, he next resorts to, as the source of caries; but whatever we eat or drink, can only act on the

teeth while it remains in the mouth: yet so far we agree with him, that the relics of any diet, allowed to stagnate in the interstices, as we have already pointed out, will be sufficient to produce the disease, without the aliment being of any particular kind. The same objections apply to the influence of temperature of the atmosphere; for in all countries teeth are found sound and healthy. This is a proof, that the cause is entirely of a local nature, and confined to that part where the disease first appears.

Caries, it is clear, can never arise from irregularity of the teeth, nor yet from their being placed too close to each other, or improperly situated in any part of the mouth; excepting, so far, as such circumstances may afford a more convenient lodgement for food and other matter, to act upon them chemically. On the subject of caries, from the above facts, we are led to conclude, that no one part of the teeth is more liable to

disease than another; and that caries is not peculiar to them at any certain period of life: but, when the cause is applied, the decay is more rapid in childhood than in the adult; which has given rise to the common expression of "bad teeth, so young, I am surprised." This surprise instantly ceases, when it is considered, that the teeth of young children are very little harder than wood. In dismissing this subject on caries, it may not be amiss to state, that the calamities of war have afforded the author an opportunity, with which few, perhaps, of his profession, have been favoured, of investigating the true cause of caries; and of satisfying himself, in regard to the accuracy of his own theory. He has now, in his possession, thousands of teeth, extracted from bodies, of all ages, that have fallen in battle, inflicted with caries from its first commencement to the last stage of the disease; and he will undertake to satisfy the most scep-

tical on this point, that caries universally commences *externally*. What has, in all probability, given rise to a contrary opinion is, that the aperture in the enamel, through which this disease finds its admission, is, in many cases, so exceedingly minute, as to escape the detection of all, but those who are aware of its true cause.

TARTAR.

EXCEPTING the disease of *caries*, nothing is so destructive of the healthy condition of the mouth, or of the durability of the teeth, as the accumulation of tartar. This is an earthy substance, held in solution by the saliva, and is deposited on the teeth as the saliva undergoes decomposition. Almost every person is subject to the formation of it, in a greater or less degree; in some, the deposit is so habitual and copious, that, without unremitting attention, there is no guarding against its accumulation; whereas in others, it is so small in quantity, that the least degree of care is sufficient to keep the teeth perfectly free from it. Similar concretions are known to be deposited in other parts of the

body, of a nature corresponding with the fluids that pervade those parts of the system.

In some, the tartar is deposited in greater quantities, during disorders of the alimentary canal. It is also increased by an inactive and obstructed perspiration. Hence, its accumulation, during sleep, is greater than at any other time. It soon acquires a hard consistence, insinuates itself under the gums, and detaches them from the necks of the teeth. Thus the gums become subject to inflammation and pain, gradually recede from the teeth, and produce an absorption of the alveolar process. So, in proportion to the increase of tartar, and its adhesion to the teeth, their natural support is destroyed, they become loosened in their sockets, and at last fall out. This happens to one tooth after another, until the whole are lost. When the teeth come out in this manner, they appear, on inspection, perfectly

sound, and betray no mark of caries or other disease; for the tartar acts as an artificial covering to the natural enamel; and while it loosens them in their sockets and detaches them from their situation, it protects them from the action of other external agents, whenever it covers them. When it is allowed to accumulate, it thickens, and becomes hard on the parts which do not undergo friction, particularly between the teeth, and at the base of their crowns next the gums, as well as about those teeth situated near the openings of the salivary ducts. Hence the incisores of the under jaw, and the molares of the upper, are most covered by it.

Where any of the teeth are wanting, so that friction does not take place in the act of mastication, the tooth corresponding to the one lost, very rapidly becomes encrusted with tartar.

The colour of tartar is various, as well as its consistence; when soft, it has

a yellowish appearance, but, as it thickens it becomes of a dark brown or of a blackish colour. Its accumulation gives always to the teeth, a disgusting and uncleanly appearance, and though in itself inodorous, yet from its effect in producing diseased gums, the breath receives a disagreeable taint.

As it forms, it deposits itself in layers, acquiring often such an extraordinary magnitude, as to equal the size of the teeth themselves. In some cases, the tartar has been known to acquire a peculiar corroding nature: in this case, its colour differs from common tartar, being of a dark green, and it is more of a fluid than of an earthy nature, having little tendency to incrustate. It is perhaps this species of tartar, which is mentioned by Dr. Armstrong, of St. Vincent, when he states the fatal diseases which often follow the bite of the negro there, and which he attributes to the noxious

qualities contained in the tartar of their teeth.

The analysis of tartar has been made by several chemists, and it seems chiefly made up of phosphate of lime—its earthy part; the remainder, consisting of *fibrina*, the foundation of the animal solid, and a proportion of oil or fat. Of these materials, the phosphate of lime is by far the most abundant.

TOOTH ACHE.

THE ultimate effect of caries, is, by denuding the internal structure of the teeth, to produce that unpleasant and painful sensation, termed tooth ache. The pain attending it, is, in various degrees, according to the influence of external agents, on the denuded part. Often it is so acute, as to produce delirium and convulsions. At other times it is moderate, and rather a gnawing than an acute pain. The caries has generally made some progress before tooth ache commences. The pain is commonly sudden in its attack, darting from the tooth through the head, and affecting the whole jaw. Where fits of tooth ache frequently occur, they become so violent and constant, that the

rest is disturbed, the appetite fails, and the person is unable to pursue his usual vocations. The original seat of tooth ache is always confined to the cavity of the teeth, and not to the investing membrane, as erroneously supposed. In the progress of the disease, the membrane, and all the contiguous parts, become inflamed, occasioning considerable swelling, which having attained a certain height, the pain often, in some degree, subsides, though in other cases it becomes more acute, and ends in suppuration of the surrounding parts. In severe cases of tooth ache, the swelling and inflammation of the surrounding parts is so great, that the mouth cannot be opened, and the eye often becomes nearly closed. The swelling has even been known to extend down the neck, and to be productive of general irritation. When this is the case before its termination, suppuration ensues, and the alveolar processes in consequence of

their inflamed state, are removed by the process of absorption.

Where matter repeatedly forms about the fangs of the teeth, the sockets become so much absorbed as to loosen the teeth; and even the jaw bone occasionally suffers from this inflammation, and its partial mortification at times is known to ensue.

When this misfortune happens, it can only be remedied by the process of exfoliation, which is slow in its progress, and occasions a greater or less deformity for the remainder of life. The pain of the teeth is often peculiar to the situation of the tooth affected. Thus, when it attacks the *dentes sapientiæ*, or wisdom teeth, of the lower jaw, it is not felt so much in the teeth themselves as in the ear. When it affects those of the upper jaw, it seems to shoot more directly up to the temple. In all cases, a remarkable sympathy seems to prevail between the affections of the teeth and the ear; for

pains in the teeth cause a similar suffering in the ear, and, in like manner, harsh and discordant sounds produce an unpleasant sensation, known by the term of the teeth being set on edge. But the most alarming disease, connected with the state of the teeth, is that affection, known by the name of *Tic Douloureux*. This disease consists in the irritation of certain nerves, the commencement of this irritation is connected with the teeth, and is of a most alarming nature. The pain is most excruciating, and recurs in fits on the slightest agitation, produced by mastication, speaking, walking, riding, &c. The nature, however, of this disease is but little understood, and is fortunately but of rare occurrence.

Indeed, such is the sympathy of the teeth with each other, and the diffusion of pain from one to another, that the patient has often a difficulty to point out the original tooth from which the pain proceeds. Hence, it is not uncommon

for a person to feel a pain in the teeth of the upper jaw, when the disease originated in a tooth of the under jaw. But, independent of their sympathy with each other, the teeth have a remarkable one with other parts of the system. Thus tooth ache is often one of the accompanying symptoms of pregnancy during the first months; though, when the teeth are examined, they discover no apparent marks of disease. The treatment of tooth ache is a subject of much importance, and must be varied according to the circumstances of the case; it is, therefore, necessary to ascertain, whether it arises from caries, tartar, cold, or sympathetic affections.

OCCASIONAL EFFECTS

OF

DISEASED TEETH.

DISEASED teeth often occasion that affection of the gum termed *epulis*, or gum boil: the inflammation of the tooth extending to the vessels at the point of the fang, and thence to the periosteum and sockets; the circulation becomes necessarily impeded, and the inflammatory action thus begun, ends in the formation of matter within the alveolar processes. While this matter is confined, it excites considerable pain; the face is swelled and inflamed, which continues till the collected matter escapes. This it does, by eroding the socket on the outer

side, where a natural opening or ulceration takes place; the sore occasions a perpetual discharge, and the skin rises and becomes fungous, with a red spongy appearance. If the diseased tooth, which is the source of the evil, be removed, the discharge then gradually diminishes, and the sore heals externally: but, in healing, the former destruction of the parts, occasions a contraction of the skin, and a deep scar is formed, which to a female cannot fail to be highly disagreeable, and a source of great uneasiness. When, under these circumstances, carious teeth are extracted, a fleshy substance appears to cover their fangs, which extends to the bottom of the socket; and is that method which nature employs by means of granulation, (the effect of the healing process,) to fill up the cavity, occasioned by the loss of substance, during the inflammatory action.

Where the disease is entirely neglected, the inflammation often extends

deep into the jaw bone, and the consequence is, that a part of it separates, and mortification ensues. Before this happens, and exfoliation is accomplished, a continual uneasiness prevails, and a constant discharge takes place in the mouth.

As the process of mortification, or separation, of the parts proceeds, the alveolar processes are gradually left by the gums, and the bone, separating and gradually loosening, should as soon as the separation is completed, be taken away. When a gum boil forms with any of the temporary teeth, it requires very particular management; for, if allowed to proceed so far as to cause an exfoliation of the jaw bone, the teeth may be entirely destroyed.

These circumstances point out the necessity of early care, to prevent a malady of this kind. But, sometimes, instead of matter forming, the inflammation attending a carious tooth is of an indolent

nature, producing, at the bottom of the socket, a hard lump, about the size of a nutmeg. This appearance will continue without any change for months, except when some active irritation occurs from cold or other causes, which produces considerable uneasiness and pain of the parts. Such tumours are always to be considered dangerous; for there is no dependence on their continuing in an indolent state.

From the view taken in the preceding pages of the teeth, and their diseases, we are led to notice the parts which support them; namely, the gums and the alveolar processes.

STRUCTURE OF THE GUMS.

THE gums, when in a healthy state, are of a vermillion colour, of a semi-cartilaginous consistence, and highly vascular. They adhere firmly to the necks of the teeth, passing between them and attaching to the bony divisions of the alveolar processes, (which connect the inner and outer gums) and their extreme edges lie upon the enamel. The gums, which are between the teeth in the upper jaw, descend lower, and in the under jaw, are situated higher than the other parts. Hence, at the necks of the teeth they form an arched appearance. In their natural state they possess little sensibility; but, from accumulations about the teeth, they acquire such an extreme degree of it, that the least pres-

sure occasions pain: they are liable to bleed, and become considerably discoloured, thickened, and enlarged. In infancy, during the progress of dentition, should there be inflammation of the gums, the slightest touch produces so much suffering, that children will even refuse the breast, on account of the pain attending the necessary pressure of the nipple. On the contrary, where there is no inflammation, the gums are so insensible, that infants are pleased with sucking or biting a hard crust. In old age, when there are no teeth, the gums possess so little sensibility, that the chewing or bruising of food is attended with no pain; and it is well known, that those who have lost all their teeth, enjoy their food much more than those who have diseased ones. It is clear, therefore, that all diseases of the gums, at every period of life, originate either from dentition, or from uncleanliness of the mouth, and are not peculiar to the

gums themselves, as erroneously asserted by authors on this subject. The most frequent disease, which has been supposed peculiar to the gums, is what is commonly, but erroneously, called scurvy, from their assuming an appearance similar to that of the scurvy at sea; a complaint always proceeding from uncleanly teeth. The disorder is marked by the gums becoming redder than ordinary, spongy, discoloured, and bleeding from the slightest touch, caused by the fulness of the vessels. This disease of the gums is entirely of a local nature, and when neglected, is productive of much uneasiness and distress; for, besides their being soft and spongy, the mouth becomes very painful and sore, and the teeth so tender as scarcely to allow the mastication of food. Matter forms and oozes out near the necks or lower parts of the teeth, in consequence of the ulceration, forming between them and the gums. The natural arch of the

gums is thus destroyed; they become uniformly straight, recede from the enamel, and thus expose the fangs of the teeth to whatever is taken into the mouth. This affection next attacks the alveolar processes, where absorption taking place, they are gradually destroyed, and thus the teeth, losing their support, become loose, and successively drop out at intervals, until the person is rendered toothless. Persons who lose teeth from this cause, complain that they come away perfectly sound, not considering it as the effect of uncleanliness.

Scurvy of the gums, is a disease with which most individuals are more or less affected, under the usual method of managing the teeth. It is, as before stated, local; and, from the very nature of the cause, will affect the gum on one side of the tooth, and not on the other. In its early stage, this disease is easily cured by the use of the dentifric apparatus. The habitual application of this

apparatus will produce a healthy action in the vessels, and keep the teeth clean; thus preventing any recurrence of the cause which produced it. The brush, when first used, should be employed rather delicately, as also the waxed silk, until the gums harden and regain their arched appearance. Although the gums may at first become subject to a slight bleeding, yet in a few days, by a perseverance in the treatment recommended, this bleeding will cease; nor will the slightest pain be experienced.

When the disease has proceeded to such a length, that matter oozes from the gums, and the teeth feel tender and painful, a dental operation is the only remedy.

After the operation, the above treatment will have all its influence, in producing the desired effect; but there is an ultimate stage of this disease, where it does not prove altogether effectual, in consequence of a death taking place in

the periosteum, which covers the fangs of the teeth.

Persons occasionally subject to inflammation of the gums, should clean their teeth often with the waxed silk; when a new and healthy action will be communicated to the gums, and they will be restored, in a short time, to their naturally firm and adhesive state. By this uniform proceeding, the interstices will be kept clean, and the teeth will become more firmly attached in their situation.

STRUCTURE

OF THE

ALVEOLAR PROCESSES.

THE alveolar processes, though originally elongations of the jaw bones, do not belong to them, but are considered as appendages to the teeth. In these parts, as we have shewn, are deposited the first rudiments of the teeth, which they continue to retain in all the stages of their growth, and to the fangs of which, their shape is gradually accommodated. Like the periosteum in other bones, they are invested with a vascular membrane, which is attached to the fangs of the teeth, and by which the latter are fixed in their sockets. The destruction of the

membranous lining loosens the teeth, and from this circumstance the single fanged ones drop out, whilst those that are double and irregularly fanged are retained. This dependence of the teeth on the membrane for their attachment, allows them a certain motion, intended by nature, in some degree to prevent injury, as it enables them to yield to the resistance occasioned by hard substances, during the process of mastication. This motion is most sensible where the fangs are inflamed; and from the increased sensibility of the periosteum, the teeth appear as if loose to the patient, and he is led to suppose, that the extraction may be performed without difficulty or pain, which has too often been proved to be a complete mistake.

In all cases of diseased teeth and gums, the alveolar processes, from their intimate connexion with them, are more or less exposed to injury. The inflammation of the former extends to the

latter, which, from increased action of their absorbent vessels, undergo a removal of their substance. Thus their absorption constantly attends the loss of the permanent teeth, under every variety of age, from whatever cause that loss may proceed.

Where all the teeth are lost, it may be observed, that the upper jaw is diminished in length, the roof of the mouth loses its arch and becomes flat, and the under jaw is a mere piece of bone covered by the gums. Thus the face loses an inch and a half, of its former extent; and, from the muscles of the lower jaw, being obliged to act more forcibly to draw it against the other, are produced those striking and well known marks of old age, the deformed features, the hollow cheeks, the wrinkled face, and projection of the chin.

Some authors, particularly Mr. Fox, have considered the alveolar processes as subject to peculiar diseases, inde-

pendent of the teeth and gums: but these I have never been able to trace: and wherever their absorption takes place, at any period of life, it will be found to have proceeded from an affection of the primary parts. Whenever the alveolar processes become diseased, the gums will be detached from the teeth, and will recede in proportion as the alveolar process is destroyed, the absorption gradually advances, the necks of the teeth and the fangs become more and more exposed, and seem to those unacquainted with their structure, as if increased in length. The causes of alveolar absorption are, continued inflammation of the teeth or gums, an accumulation of tartar, that affection of the gums called scurvy, and their diseased state arising from an excessive use of mercury.

The symptoms of this state of the alveolar process having commenced, are, the length of the teeth, the wider space between them, and a difficulty in chew-

ing hard substances. The teeth next become loose, and mastication is altogether impracticable.

Besides absorption of the alveolar processes, an opposite affection may be noticed. The bottom of the socket fills up, or becomes contracted, by which it is proportionally shorter, and the teeth are forced out, while the gum undergoes no change, but still retains its place; and the teeth continuing to advance, gradually lose their support, and in the end drop out.

In many persons, the loss of a tooth is hastened by being longer and striking against the others; this may be easily rectified, by shortening the tooth with a new dental instrument I have invented for the purpose.

MANAGEMENT OF THE TEETH.

THE first and most important object, is cleanliness of the mouth, which is the *only* preventive of disease. Of the various causes of diseases of the teeth and alveolar processes, we have found that the greater part as enumerated by writers, are merely theoretical, and are built on no solid facts. The only true cause of all the diseases to which they are liable, is, the contact of the accumulation, and the action of that matter upon them, which forms the relics of our food and beverage, and which operates by undergoing the putrefactive process, as a deleterious poison, or corroding agent to their structure.

Where the teeth are kept clean and free from such matter, no disease will

ever arise. Their structure will equally stand against the summer's heat, and winter's cold; against the changes of climate, the variations of diet, and even the diseases to which the other parts of the system may be constitutionally subject.

This being the case, the means of prevention are clear and simple; namely, to avoid the accumulation of matter which injures their substance; and it is in the mode of cleaning them, that the whole secret of avoiding disease consists.

The means commonly resorted to, are the use of the brush, joined with the friction of tooth powder; but, that both brushes and dentifrices, as they are at present used, however ingeniously contrived or often employed, are insufficient for the purposes of effectual cleansing, is obvious from this circumstance, that the teeth and gums are still left in a diseased state. Tooth powders, being generally composed of insoluble sub-

stances are acid ingredients, and evidently hurtful, both by their mechanical and chemical agency.

The brushes and powders are generally applied to the outside only of the teeth; and to shew the injury of these applications, we shall make some observations on their composition and nature. The sulphuric acid, or oil of vitriol, from its peculiar and well known property, of giving a beautiful white appearance to the teeth, forms a principal ingredient in all those ruinous compositions, sold under the title of tooth powders, tinctures, or pastes. In tinctures and lotions, it is combined with some spirituous or watery infusion, of an aromatic nature, variously coloured and scented, according to the taste of the composer. In the paste it is united with some gritty powder, to which a light vegetable matter is added, when the whole is made of a proper consistence with honey, or other glutinous substance. The powders,

also, not admitting the acid in its natural form, have corrosive salts substituted, such as cream of tarter, alum, &c. &c. united with powder, which often consists of brick-dust, blended with some other ingredient, to colour and conceal it. But, besides these compositions, which are expressly sold for the purpose, many are in the habit of using substances at their own option for cleaning the teeth, without having recourse to these advertised specifics. Of this kind, soot is one; to which I see no other objection, than that it is a dirty, disagreeable, and indelicate substance. Its use has, perhaps, arisen from the observation, that chimney sweepers have white teeth. This is generally more in appearance than in reality: when examined, it is found to be occasioned by the contrast of the face with the natural colour of the teeth. Another substance in much greater use of late years, for the purpose of cleaning teeth, is charcoal pulverized: but highly as it

is celebrated for its antiseptic qualities, it is very improper as a dentifrice; for, however fine may be the powder to which it is reduced, every chemist knows, that the substance continues perfectly insoluble. The finer indeed it is pulverized, the easier is the admission it finds between the teeth and gums, where its insinuation, like every other extraneous matter, is a perpetual source of irritation and disease; and its constant friction may injure the health and beauty of the gums; its effect also, as a purifier of the breath, is very transient. Dentifrices similar to charcoal, are formed by the burning of bread, leather, betle nut, peruvian bark, &c.; in their effects, however, they all differ little from common charcoal: gunpowder and iron rust, is another composition in use, but it owes its quality entirely to the charcoal, as the nitre it contains is in too small a quantity to be of any use. Prepared alum, is another substance used for the

same purpose; but, being a combination of sulphuric acid and clay, when it comes in contact with the teeth, it undergoes a decomposition, and they are consequently exposed to the action of the acid. The same injury arises from the use of cream of tartar, which, though it whitens the teeth, acts powerfully on the enamel.

The best dentifrice that can be used, is common table salt: it is perfectly innocent, as it completely dissolves in the saliva, and produces all the friction that is necessary for cleansing the teeth. Nitre, is also a valuable application, both as it reduces the inflammation of the gums, and removes the tough viscid slime, which is then apt to collect in the mouth. But the cleaning of the teeth and gums, in order to preserve them in health, and prevent the attack of disease, can only, as we have before stated, be done in a proper manner, by using the dentifric apparatus already described.

This is as simple in its construction

as it is easy in its application; and its use, if persevered in, will preserve the teeth, gums, and sockets, in a healthy state, and render them less subject to disease than any other part of the body. The idea, that the teeth are more destructible than any other part of the system, is founded on a mistaken opinion, of which we find evidence every day, in bodies, which have been buried for years, where the teeth have been found entire and sound, while the other bones were decayed and mouldered to dust. This is a sufficient proof that disease is not naturally entailed upon their structure, but the effect of carelessness, inattention, or the want of cleanliness.

It is in the power, therefore, of every individual to preserve the teeth and gums in perfect health, when once instructed in the proper method of cleaning them. What a world of pain and distress are we thus enabled to avoid by a little trou-

ble and care!—the attack of serious diseases, sapping the foundation of health, arising from this cause, might be entirely prevented; and the stomach and digestive organs would also be preserved in their natural and regular state. By perfect mastication, the process of assimilation would be greatly facilitated, and the nourishment would enter the system in that complete form capable of transmitting its benefits to the most minute recesses of the body; and thus dyspeptic complaints, which begin at an early period, and are the bane of those past the meridian of life, would not be so frequent as at present, nor call for the aid of the physican, or the constant use of the stomachic tincture and pill.

When the teeth and gums are capable of performing their proper offices, the food is always relished, and health, that greatest of blessings, uninterruptedly preserved. It may, perhaps, be necessary to give some directions for clean-

ing the teeth, adapted to the varieties of age.

In childhood, before the loss of the temporary teeth, the mouth should be regularly cleaned every evening, the relics of the food, which have been all the day accumulating, are thus prevented from committing their ravages during the night; and the habit of cleanliness will become fixed, from being so essentially connected with personal comfort. The brush should at first be but gently applied, and then particular care taken to pass the waxed silk in the interstices, and round the necks of the teeth, where lodgements of the food (the causes of disease) are usually formed. Warm water is always preferable to cold for cleaning the mouth, from its being a better solvent of the usual articles of their diet. But when the permanent teeth begin to make their appearance, then is the time that the greatest attention to cleanliness is particularly necessary.

It is a common practice with most people after meals, to make use of a tooth-pick, to remove whatever may be lodged between the teeth. This practice, however, is highly to be reprobated: the constant use of a tooth-pick cannot fail to make improper openings between the teeth; and when once that part of the gum which forms the arch, is removed from their interstices, a small hollow is made for the reception of accumulating matter, which, if neglected to be removed, will, from its immediate action on the bone, rapidly excavate a tooth, and produce early pain, that would never have existed, but for the use of so improper an instrument.

Some popular writers have objected entirely to the use of hard brushes, and considered the finger as sufficient for cleaning the teeth, on account of its soft pliancy, and the gentle roughness of its papillary vessels. But, if this were sufficient, the tongue would answer yet

better; for its papillary vessels are still more numerous, and it possesses also greater sensibility, softness, and pliancy; yet, with all these advantages, it does not prevent the accumulation of tartar, which is always more abundant on the inside of the teeth, where the action of the tongue is most powerful. The same objection may be applied to cleaning the teeth with a cloth, which, though it may partially remove what is on the surface, cannot, from their inaccessible situation, act on those parts that it is of the most importance should be kept clean.

Many people suppose that the gums cannot be preserved in a healthy state, unless they are exposed to the daily friction of the brush. This, however, is a mistaken opinion; and, indeed, if the friction is constantly applied in a perpendicular direction, it will, by forcing them from the teeth, be highly injurious. If the gums are actually diseased, the application of a composition of salt and

alum, in the proportion of one of the latter to four of the former, either in a state of solution, or used as a powder, will, in the course of two or three days, effect a temporary cure; when if the tartar is immediately removed, and the interstices of the teeth kept clean, no other means will be necessary to keep them perfectly pure and wholesome for the remainder of life.

OPERATIONS ON THE TEETH.

SCALING.

THE first and simplest operation on the teeth, is the removal of the tartar, termed scaling. The instruments for this purpose are made of various forms, and so constructed as to be applied easily to the different parts of the teeth. It is an operation which is not attended with pain; and, for its utility, we may refer to the observations already made on the accumulation of tartar, as one cause of disease. In employing the instruments, I can with confidence say, I have never found a patient complain of the slightest

pain, nor even perceive the smallest scratch on the enamel, after the tartar had been removed. This is prevented from the lightness of hand, with which the instrument is conducted over the surface of the teeth; a dexterity acquired only by practice and experience.

Instead of performing this operation by means of instruments, some dentists, from a desire to make the teeth appear white, have employed chemical solvents. But, as the tartar contains the same principle of solidity, as the teeth themselves,—namely, phosphate of lime and fibrina, whatever acts in destroying the tartar, must also act in injuring the teeth: such means, therefore, are to be strongly condemned, and will never be employed by an operator of any respectability. The benefit derived from the removal of tartar, is not to be estimated according to its quantity, but according to the situation in which it is

placed; for, if a very small quantity has insinuated itself in the interstices, or round the neck of a tooth under the gums, the removal of it, is of more importance to the patient, than a greater quantity on the crown. This fact is proved by daily observation; for teeth become loose, and fall out early, with very little tartar upon them.

A popular prejudice prevails against scaling the teeth, from its having been observed, that, after such an operation, they tend more rapidly to decay; a circumstance easily explained. For, while tartar is confined to the crown of the teeth, so as not to interfere with the gums, however disagreeable in appearance, it acts as a complete preservative against the attack of caries. This natural protection, therefore, being removed, it will be easily seen why, if the teeth are again neglected, their liability to decay should be increased. This ef-

fect, however, is completely prevented, by the constant use of the dentifric apparatus, which will also supersede the necessity of future scaling.

EXTRACTION OF TEETH.

THIS is an operation which always creates some little alarm to the patient, and is sometimes attended with difficulty and danger; but, in this, as in many surgical operations, the ease and safety with which it is executed, will depend on the skill of the operator; though, for the consolation of patients, my experience warrants me in asserting, that extraction is much oftener resorted to than is necessary. Whenever a tooth is painful, it is advisable to have it examined, and an endeavour should be made to remove the malady by palliative means; but, if it prove carious, the diseased part should be removed, and the tooth repaired. Indeed there is no necessity for having recourse to this dan-

gerous expedient, even if the crown be entirely decayed; for the fangs of the teeth will always admit of engrafting, on a plan I have for years so successfully practised. Extraction therefore can only be necessary, either to prevent, or remedy, irregularity in the arrangement of the permanent teeth of children, or, in some diseases of rare occurrence in the adult, as in neglected cases of the *antrum maxillare*, as well as, where the diseased state of their fangs has, from neglect, terminated in what is called an ulcerated tooth. In all other cases it is to be opposed, and is a wanton outrage on the unhappy individual, who, from the effect of pain, is brought to submit to this harsh and often unavailing measure. But, independent of the little necessity for such an operation, we know that it has sometimes been attended with the most serious and fatal consequences.

Even in the most favourable case, there must be a fracture of that part of the socket where the fangs are situated; and if the alveolar process is firmer than usual, and does not yield to the power of the instrument, the fracture may be extended through the alveolar processes of several teeth, and the jaw bone be exposed to a most serious injury, the effects of which the patient may retain for life; and the formation of matter taking place, several of the contiguous teeth will be rendered useless. But, though the operation may be successfully performed, a dangerous hæmorrhage often follows. Some patients have suffered a continued bleeding for twenty-four hours, and their lives have been with difficulty preserved, while other cases have ended fatally from this cause alone, in spite of all the boasted powers of styptics.

This alarming effect of extraction arises from the artery not always con-

tracting after the removal of the tooth, either from the injury done to the parts, or from its being of a larger size than usual, and the coagulum that is formed not being sufficient to prevent the effusion of blood. As these consequences cannot be foreseen, the operation is a more serious one than is commonly imagined; and should, therefore, never be trusted to the rash or ignorant. Much likewise depends on the state of the patient's constitution at the time of extraction. In some persons we find so strong a disposition to gangrene or mortification, that the slightest scratch or cut will produce a tendency to it. In such habits the extraction of a tooth, aided by the putrefactive process arising from a diseased state of the gums, will easily excite inflammation, when either a tedious ulceration and exfoliation of the parts will ensue, or else the patient will be cut off by a mortification rapidly extending its effects to the jaws, face, and throat.

A dreadful instance of which lately occurred in Guy's Hospital, where a patient died solely in consequence of the extraction of a tooth.

For these reasons I strongly object to the extraction of teeth in all cases, but those specified in the preceding observations; where extraction, however, is advisable, I employ an instrument similar to that of an engraver's tool. In this I differ from all other operators; for they uniformly prefer the key instrument, so long in use. It is true, that it has undergone several alterations, and has received some improvements; but the principle of it, even in its most improved state, remains the same, and cannot be too strongly reprobated.

MENDING OR CAPPING

DISEASED TEETH.

THIS is an operation which is rarely attempted by dentists; and it must give no little satisfaction to those having carious teeth, to know they can be completely repaired by a new mode of operating peculiar to myself.

The carious teeth are thus rendered ornamental and useful through life, and every complaint prevented which arises from imperfect mastication. An accidental circumstance first convinced me that a part of a tooth might be supplied, and that in so perfect a manner as completely to escape detection.

The frequent performance of this operation has enabled me to execute it with

success, in situations where I did not at first conceive it practicable. It is attended with scarcely any pain; and the discovery will, in most cases, supersede the necessity of extraction.

A knowledge of the evils which may result from a carious tooth, even if unaccompanied by pain, should influence every person, on its first discovery, to seek the proper remedy; for by capping the diseased tooth, the lodgement of food, occasioning the putrefactive process, is prevented, and the consequent taint of breath removed; the progress of decay is arrested, and the pain arising from tooth ache, or any other cause, completely done away. But where the teeth are painful, and attended by inflammation of the gums and sockets, this operation should be suspended till the painful symptoms subside; for the cavity of an inflamed tooth is then so sensible, that the accidental introduction of any substance will excite the most

acute pain: it is therefore advisable, first to diminish the increased action, which may be done by filling the carious tooth with cotton, dipped in an infusion of oil of cinnamon and gum camphor; and, as soon as the tenderness or pain is removed, then should the operation of capping be performed.

In cases where the crown of a tooth is entirely decayed, I have found means of supplying the deficiency without having recourse to metallic aid, or ligatures.

ARTIFICIAL TEETH.

THE utility and importance of this invention may be fully appreciated, when we consider, that by the loss of teeth, the youthful countenance acquires all the character and deformity of age; the natural expression of the features is changed, mastication impeded, and the power of correct enunciation entirely destroyed.

My mode of supplying teeth is as different from any employed by my predecessors, as it is far superior to all that are at present known. They are formed from a substance warranted not to change its colour, are rendered perfectly durable, contrived so as to baffle detection, combining ease with beauty, and are, in all

respects, as efficient as those of the natural set.

On this branch of the dental art much labour and ingenuity have been bestowed; and it is the exactness with which artificial teeth are adapted to the mouth, and the ease with which they can be worn, that constitutes their chief excellence. The mode of supporting teeth, by means of ligatures, round the contiguous ones, I very early found sufficient reason to discontinue in my own practice; nor is the other method of fixing the artificial crown by means of a gold or silver pivot, as was recommended and practised by Mr. Fox, liable to less objection; as, on this plan, the pivit soon wears away the fang, the artificial crown becomes loose, and will at last drop out. This has been generally considered as the fault of the operator, in not adapting such teeth with sufficient nicety to the fangs; but the blame attaches rather to the principle

than to the dentist; for it is impossible that a pivot, made from a harder substance than the bone of a tooth, can be used without the latter sustaining injury from the constant friction. The same objection may be applied to the fastening artificial teeth by clasps, or springs, round the necks of the natural teeth, or securing them by means of fine wire, or Indian grass; for, in whatever way it is applied, it tends to destroy the periosteum.

But, besides these inconveniences arising from the use of artificial teeth, secured by ligatures, pivots, clasps or wire, a still greater objection is the taint the breath receives from the particles of food, which remain about the teeth, and which, from the nature of these contrivances, appears to be unavoidable.

The author has long abandoned this destructive practice, and is able to perform the operations in such a manner, as to render artificial teeth completely secure, without either of the above me-

thods. This, he has no doubt, will be a matter of astonishment to those, who are acquainted only with the common mode of operating; but he is ready to convince the most sceptical on this subject. Incredible as it may appear, the witnesses of his practice, both abroad and in this country, will prove the decided superiority of the *Parmlyan System.* His method, he is satisfied, is *entirely new* in this country, and is considered one of the greatest improvements in the dental art.

Where the teeth are mostly gone, in both or in either of the jaws, the method is to form an artificial set, by first taking a mould of the risings and depressions of every point along the surface of the jaw, and then making a corresponding artificial socket for the whole.

If this be accurately fitted, it will, in most cases, retain itself sufficiently firm, by its adhesion to the gums, for every

purpose of speech and mastication. If this adhesion cannot be rendered sufficiently complete, from the irregular form of the jaw, then it must be supported by springs. On its first application, such a mechanical apparatus feels unpleasant, but habit soon reconciles the wearer to its use. The gums become hard, and the sensibility of them nearly obliterated, so that at last the person feels uneasy without them.

Artificial teeth are commonly made from the tusk of the hippopotamus or sea horse, which has been preferred for its whiteness, durability, and fine enamel. The chief objection to its use, is, that it does not resemble the human teeth in colour. This difference is more apparent, when placed by the side of a natural tooth, than when the entire set is made from the same substance.

Artificial teeth have likewise been formed of a paste, termed mineral teeth; they are composed of baked earth

covered with an enamelled flux, and coloured to imitate nature. This substance is best suited to entire sets, but objections arise to such teeth, as they are easily broken, and do not assume the healthy appearance of the human teeth. Neither have they ever been formed so as exactly to imitate nature, but are easily discovered to be artificial machinery; and many improvements are still wanting to render them complete. Having succeeded in supplying the loss of teeth, as already stated, without the aid of ligature or any metallic substance, and, aware of the prejudice prevailing against the use of natural teeth for this operation, I succeeded in discovering a substitute, possessing all their advantages of form, durability, and colour, in the teeth of certain quadrupeds smaller than the sea horse; the beauty of whose enamel is superior, and whose form requires little or no alteration. This invention I have now successfully employ-

ed for years ; and my practice requires only a comparison with the operations of other dentists, to estimate fully the importance of such an improvement.

In all cases of artificial teeth, an attention to cleanliness is indispensably necessary; for they, as well as the human teeth, unavoidably accumulate tartar ; and from the particles of food adhering to them, they become highly disagreeable. They should be frequently cleaned with warm water; and, by means of the dentifric apparatus, they may be rendered equal in appearance, wholesomeness, and durability to the natural set.

TRANSPLANTING OF TEETH.

THIS is a painful operation, and not often attended with the desired success. It was once a popular practice; and is performed by completely extracting the diseased tooth, in whose place another is to be introduced. The tooth to be substituted, is then to be removed from the mouth of a person, previously provided for this purpose, and instantly transferred to its intended situation, where it is properly fixed till it unite firmly to the socket.

This operation is, at best, but limited, being confined to the front teeth, or those having single roots.

The practice was first suggested, and acted upon, by the late Mr. John Hunter; it continued a few years after his

death, but is now, for strong reasons, entirely given up; for, first, it did not always succeed, nor could it be expected; facts proving that when teeth are extracted by mistake, they do not always become firm again, even when immediately replaced. Much less can a tooth, belonging to another person be expected to become fixed, when inserted in a socket of unsuitable dimensions.

Besides, after submitting to the operation, and undergoing, for weeks, all the penance of a fluid regimen, and even where a transplanted tooth, under the most favourable circumstances, has fastened, experience has shewn that its duration is limited to a very few years.

To this may be added the turpitude of disfiguring one person for the sake of another; and the danger of introducing disease, which Mr. Hunter has laboured so strongly, but unsuccessfully, to oppose. He admits, however, that this operation has occasionally produced dan-

gerous symptoms; but that these arise from the principle of irritation alone, exciting deranged sympathies. But whatever may be the cause, the consequences have been, in many instances, unpleasant and alarming; and, if the mere irritation of a foreign body, applied in this way, is sufficient to produce them, it is a strong reason for laying the practice aside, whether it is capable of introducing infection and general disease into the system or not.

IRREGULARITIES.

OF THE

TEETH.

IN all cases of irregularities, during the shedding of the teeth, the treatment to be observed, is to remove the obstructing temporary teeth, and then to apply pressure, in the most convenient manner, upon the irregular tooth, in order to direct it into its proper situation. But parents, unfortunately, do not in general, perceive the necessity of having recourse to professional aid, until the irregular growth of their childrens teeth, is so far increased as to amount to a manifest deformity. Where sufficient room is not made for the perma-

nent teeth, by the timely removal of the temporary set, irregularities of the former are often met with; and where these irregularities are allowed to proceed and become fixed, it is often a matter of difficulty, and sometimes of impossibility, to rectify them.

Thus, where the permanent teeth are large, and the jaw bones have not grown sufficient to admit of their enlargement, in a regular manner, they crowd and over-lap each other. In the same manner the central incisores of the upper jaw are often pressed forward, and rendered so prominent, as somewhat to resemble in shape the mouth of a rabbit. When the space of the jaw is not sufficient for the regular arrangement of the teeth, some must then be considered as superfluous; and it will be necessary to remove one or more of the *bicuspides* from each side of the jaw, before the fangs are formed, to give room to the rest; the incisores must then be gradu-

ally forced into their proper situation. The occasional pressure of the finger and thumb, if attended to, before age has given too much firmness to the jaw, will invariably bring the teeth into their proper places, without the necessity of having recourse to continued pressure by means of instruments adapted to the arch of the mouth, as recommended by Mr. Fox.

But, in some cases, the cause of irregularity arises not from the want of space in the jaw, but from the protrusion of supernumerary teeth, which are generally of a deformed shape, and somewhat resembling the cuspidati. These protrusions usually take place in the upper jaw, and if inside, they are in front of the jaw, or when without, near the molares; and are always very conspicuous, and should, as soon as their growth will admit of it, be extracted.

But the most frequent irregularity, which occurs in the appearance of the

teeth, is, where one is longer than the other, or where they have ragged edges. This often takes place in the edges of the front teeth, which are so irregular as to resemble a saw.

These irregularities, in order to avoid inflammation in those parts of the mouth that come in contact with them, it will be necessary to remove, which is easily effected by the improved dental instruments, which cut much faster than the file, without producing any unpleasant sensation.

No injury will attend this operation; on the contrary, it will improve the shape, and prevent any further cracking, or separation of the enamel. The application of the file has been considered injurious, by those who suppose the removal of part of the enamel, to occasion the decay of the teeth. But a partial loss of the enamel, or even a larger portion of the tooth, while the cavity remains untouched, will never occasion

its decay. This is confirmed in those cases where the enamel is broken by accident, as well as by the operation of filing, for the purpose of removing the carious part, which preserves the rest of the tooth entire. The truth of this observation will further appear from a practice that obtains among savages; for, it is well known, that the Abyssinian negroes remove the corners of the cutting edges of the incisores, so as to give them a pointed appearance; and, by not interfering with their cavities, such teeth receive no injury whatever, from the operation of the file: the Malay Indians likewise file the incisores of the upper jaw, in a direction across their anterior surface, giving them the appearance of being fluted; but, by this operation, the cavities of the teeth become exposed, and caries accordingly soon takes place. The chief objection, however, of patients, to the operation of filing arises from the unpleasant sen-

sation it produces :—but here the fault attaches rather to the dentist, than to the instrument ; and I have the satisfaction to state, that, in the method invariably adopted by myself in the use of this instrument, but little inconvenience is experienced, much less any excitement of pain.

FRACTURES OF THE TEETH.

THE teeth are as liable to injury from accidents as other bones, and the incisores of the upper jaw are, from their situation the most exposed to them. Boys, in their quarrels or amusements with each other, frequently have their front teeth fractured by blows received on the mouth. Falling on the face has been attended with the same effect, as also the attempt to catch a cricket ball, and many other circumstances of the same kind. Even the mastication of hard substances, when the muscles of the jaw are in strong action, will produce the fracture of a sound tooth.

In such accidents, the treatment must be regulated by the extent of the injury. If the fracture is confined to the point of

the tooth, nothing more will be required, than to make it smooth and equal with the other surface, by a fine file; and, as the tooth has not previously been in a state of disease, there will be no danger of the attack of caries. But, if the injury extend into the cavity of the tooth, it will then become tender, and for some time become subject to occasional fits of pain; but nature generally repairs this mischief by a fresh deposit of bone, in the cavity which defends the nerve, and often prevents any further trouble for the remainder of life.

Where fractures are of a more serious nature, and the cavity is completely exposed, then the age, and other circumstances, must regulate the treatment. If it occur at so early a period of life as fifteen years, the best plan is, to extract the fractured tooth; and, at the age of maturity, the teeth will be found to have approached so near to each other, as to render the loss scarcely perceptible.

This treatment applies only to fractures of the permanent teeth; for such accidents happening to the primary set, are, from their temporary duration, of little consequence; when the injury occurs at an advanced period of life, the loss is very serious, not only from its unseemly appearance, but also from its occasioning a defect in the speech. If assistance, however, can be procured before inflammation has commenced, the tooth may be easily repaired.

If a tooth is completely knocked out, and the alveolar process is not injured, it should be immediately returned to its place, and secured to the adjoining teeth, when it will fasten in a very short time.

Where a fracture is of a very serious nature, and the person is anxious about the future appearance, the remainder of the crown may be cut away, and a new one fixed to the fang.

If the blow or accident only loosen the tooth, it will in a young subject,

readily fasten again, though it is apt to lose its colour, and so assume a bluish tinge; but, where a tooth is thus loosened in more advanced life, it rarely fastens, for the fang becomes deceased, which communicates to the socket, and then the tooth becomes so loose as to require extraction.

But, in all cases, of accidents, where the alveolar processes have suffered, the fastening of the tooth or teeth can never be depended on; for inflammation is apt to arise, matter forms in the socket, and nothing but extraction will give ease to the patient.

CRACKS OF THE ENAMEL.

THESE are confined to the incisores, and are mostly caused by the too frequent or violent action of their cutting edges against each other. This arises in a great measure, from the loss of the back teeth, when the incisores are not only more frequently used in the act of mastication, but are necessarily brought into contact by a stronger muscular power. This action upon each other, occasions them to assume an appearance something like caries; but the teeth do not, as in caries, become softer, nor does it commence with inflammation, but it consists solely in the enamel parting from the bone, and it proceeds no further than to effect the exterior surface of the teeth.

Whenever such cracks or separation of the enamel appears, it is advisable, in order to stop its progress, to cut and file away the part that appears thus disfigured, taking particular care to leave the cutting edges somewhat rounded.

DENUDING PROCESS.

THIS disease, at first, begins by a wasting of the enamel, by which a small portion appears as if scooped out, or filed away. This wasting continues to increase till the bone is exposed, during which time the tooth becomes discoloured, assumes a brownish hue, is smooth and polished, and will often continue so for years. In some teeth the anterior part of the enamel has, in this way, been entirely removed, but without any exposure of the natural cavity, and the bony part has remained prominent as before. It is not unfrequent for the teeth in this state to be very tender, and susceptible of the slightest application of heat or cold. In the whole extent of

my practice, I never met with this disorder, whose cause I could not safely attribute to the use of acids in the dentifrices that were employed.

WEARING OF THE TEETH.

THE natural effect of mastication is, to wear the teeth by the friction and attrition with which it is accompanied.—Thus, where the incisores, when the mouth is closed, are so situated, that they meet each other at the cutting edges, instead of those of the upper jaw over-lapping the corresponding ones of the under set, mastication cannot be performed without a more extensive lateral motion of the jaws, which, of course, occasions a greater friction, by which the teeth gradually wear away.

This circumstance always takes place in the front teeth, where the back ones have been lost in the early part of life, and often the whole crowns have been removed. The effect of this process is

to render the teeth tender, and occasionally subject to pain; this tenderness and sensibility of the fangs, however, are gradually lessened by the ossific matter that is deposited by the vessels, until the whole cavity is completely obliterated. This deposit of ossific matter led Mr. Hunter erroneously to believe, that the teeth were extraneous bodies, with respect to a circulation through their substances; but, he justly observes, that they rarely decay after a person has passed fifty years of age; because the bony or osseous matter of the tooth has then acquired a degree of firmness of texture, nearly equal to the enamel itself.

MORBID GROWTH

OF THE

GUMS.

THE irritation produced by decayed teeth, on the circulation of the gum-vessels, is often the cause of a preternatural growth of the gums, by which excrescences or tumours form on them of various sizes. Carious stumps, are the most frequent source of this morbid growth; for, if the socket is not close at the bottom, a protrusion takes place, which makes the edges of the gums grow irregularly over it, and thus, by the pressure of the sharp edges of the stumps, a constant soreness and inflammation is kept up; the soft parts assume a diseased

action, and the gums rapidly increase in size. An enlargement of this kind, will often equal the size of a walnut, and no cure can take place, till the cause or irritating edges be removed; on this being accomplished, and the fang repaired, the fulness of the vessels is taken off by the hæmorrhage accompanying this operation, while the morbid growth, or enlargement from its fungus nature, soon decays, and the gum is reduced. At other times, tumours form on the gums without any evident cause, and unconnected with the state of the teeth. This is the cause, also, in other parts of the body, wherever a soft vascular stricture prevails. Such tumours are of a firmer consistence than where they arise from decayed teeth, resembling the gum in its healthiest state.

When troublesome, their removal should be attempted either by excision or ligature. Wherever a ligature can be applied, it is the safest method; for,

in performing excision, the operation from the vascular nature of the tumour is always attended with danger, on account of the great loss of blood, which ensues from the impossibility of taking up the vessels, or of employing any other means of stopping the effusion, than the actual cautery. Other tumours of a different nature form on the gums, which are distinguished by their particular softness and disposition to bleed. Such tumours are generally the consequence of a diseased jaw bone; and, as no cure can take place without the removal of the cause, the operation above mentioned, either by excision or ligature, has, in these cases, generally failed. If however, they arise only from the fangs of the tooth being in so very diseased a state as to have occasioned a destruction of part of the alveolar process, then a cure can be effected only by extracting the diseased tooth; and if, on examining the socket, it be found

rough and denuded of its periosteum, a weak solution of nitrous acid applied to it, with lint, and frequently renewed, will cause an exfoliation of the diseased jaw bone, and the tumour will be removed. But there is nothing, from which the gums are more apt to suffer, both in their healthy consistence and general texture, than the use of mercury, employed in various diseases. By increasing the active powers of the saliva, as a solvent, the solidity of their composition is gradually destroyed, and a spongy state takes place, giving a disposition to bleed on the slightest touch: the weakness of their texture detaches them from the teeth and socket; and thus the bony parts are left loose, and totally deprived of every kind of support.

ARTIFICIAL PALATES.

FORMERLY, when the treatment of diseases, was not so well understood as at present, the loss of the palate, and an opening between the mouth and the nose, was a frequent misfortune, producing a defect of speech, as well as an inconvenience in the taking of food.

This defect, however, from the improvements in medical practice, is now but of rare occurrence; and is confined to those unfortunate cases where medical aid has been deferred too long. A substitute is then required to fill up the opening formed by the loss of the natural palate, between the mouth and nose; and this substitute consists of a thin plate of gold or silver, made convex, so as to cover the orifice, and se-

cured in its place by a piece of sponge connected with it. Many ingenious improvements have taken place in this contrivance; and in the hands of some skilful dentists, they are applied with such a nicety, and so admirably fitted to the part as to require no sponge, nor any other of those additional aids formerly employed.

Whenever an artificial palate is worn, cleanliness must be strictly enjoined; and, on this account, it will require to be frequently removed.

LIGATURES OF THE TEETH.

THIS is an application generally used by dentists, as an artificial support to the teeth, till they become firm again, after being loosened, either by a blow, by the accumulation of tartar, or by the absorption of the alveolar processes. This practice, however, should never be employed to any extent; for, if the ligature is made with such a degree of tightness as to give a proper support, it must loosen the sound teeth it passes over, and thus increase the evil it is intended to remedy. The fastening of a tooth when loose, is entirely the effect of a process of nature, and depends on the healthy condition of the appendages of the teeth, to enclose and root it again in its situation.

In cases of an accidental blow, where the parts have not suffered from disease, ligatures may be successful as a temporary support; but where disease has occasioned an absorption of the alveolar processes, or where the accumulation of tartar has detached the gum, and perhaps even the periosteum, this success is not to be anticipated. Ligatures, therefore, if at all admissible, should be but seldom employed.

In cases of accident, after the loose tooth is properly replaced, it will be better to keep the patient on a fluid diet till it fastens, than to employ any means of support which may injure the rest. Even where ligatures are applied, they seldom continue fast for any length of time, but often break or become loose, from the solvent properties of the saliva acting upon them; when the operation must be repeated, and thus give the patient much unnecessary trouble.

For these reasons I have, in my own

practice, avoided the use of ligatures, whether formed of silk or metallic substance, and employ, what I conceive, a far preferable method for answering the same purpose.

DISEASE

OF THE

MAXILLARY SINUS

OR,

ANTRUM MAXILLARE.

WHEN the inflammation of the teeth and gums of the upper jaw is long continued and very considerable, whether proceeding from accident, or from the natural effects of disease, it is often communicated to the lining or investing maxillary sinus.

This affection is distinguished by a deep throbbing pain, which appears to be seated at the roots of the molares of the upper jaw. In its progress, it affects the eye, nose, and ear; and the in-

flammation proceeding to suppuration, matter accumulates in the cavity, and, having no vent or passage, destroys, by its corroding effects and pressure, the neighbouring bone. Where the symptoms are more moderate, matter will often remain in a confined state, for a considerable time, without producing much injury.

As soon as the symptoms of this disease are discovered, (a fact exceedingly difficult to ascertain till matter is actually formed,) the great point is to give it a free opening or discharge. The readiest way of doing this, is to extract the middle grinder or molares, the situation of which is immediately under the maxillary cavity, and afterwards to pierce through the socket with a small trochar to the sinus. The opening thus made should be preserved for some time, and detergent applications occasionally injected with a syringe, till every appearance of discharge subsides.

This state of the antrum, independent of the diseases of the teeth, has often been produced by the lodgement of worms or insects. They are conceived to have had their ovæ, or eggs, deposited in the nostril, or to have been drawn in with the breath into the nose, and thus conveyed into the antrum.

Their removal, when discovered, is to be accomplished by the operation above mentioned, and the use of oily, or other injections, till they are entirely exterminated.

We have thus enumerated the various diseases which affect the teeth, the gums, and the alveolar processes; and, with respect to the latter, in concluding we may observe, that while their growth lengthens the countenance of the infant, and gives its first and early character of youth, so, on the other hand, as we

have before repeatedly noticed, it is the loss of these processes by the destruction of the teeth, which gives the character of advanced life, or old age; for, by this loss, the chin necessarily approaches nearer to the nose, the lips turn in, and the skin, being more loose, naturally falls into wrinkles; as may be seen in figure 2, in the frontispiece.

PHYSIOGNOMY

OF THE

TEETH.

THE importance of the teeth, in speech, in mastication, and in giving symmetry and expression to the countenance, has been already sufficiently noticed.

But, it has been attempted to carry their importance further, in supposing these organs to exert an influence in the formation of the human character; and, for this doctrine, there exists perhaps some slight foundation, but certainly not to that ridiculous extent contended for by authors, whose imagination on their

favourite subject appears so completely to have misled their judgment.

That the state of the mind is often discovered in the countenance every one will admit; but the countenance is made up of parts in a high degree flexible, which vary their motions and expressions with every changing impulse of the soul. Where then the mind broods over any particular passion, or yields to one continued train of thought or feeling, the expression of such mental affection may remain fixed in the countenance, and give a determined and decided character to the features.

The teeth, on the contrary, are fixed bodies; they can receive no change from the influence of the mind, and they merely fill up, or give that finish to the countenance which can admit of no other change, as far as these organs are concerned, than what will arise from their loss.

In the ingenious system of Lavater,

they have met particular notice; and, from the appearance of the teeth and projecting chin, he has drawn many plausible conclusions.

"Thus, small short teeth have been considered as denoting a weakness of character and constitution; and, though such have been observed in many persons of extraordinary strength, yet, in those persons, they are seldom of a pure white. Long teeth are considered as sure signs of weakness and pusillanimity. White clean well arranged teeth, visible on opening the mouth, but not projecting, nor always seen, have been esteemed marks of good, acute, honest, candid, and faithful men. Where, in such persons, they appear otherwise, or are foul, uneven, and ugly, it is either the effect of sickness, or some mental imperfection which has changed them. Short broad teeth, standing close together, are the characteristics of tranquillity, firmness, and strength. Persons of

a melancholy habit, have seldom teeth well arranged, clean, and white."

Such are the maxims laid down by Lavater; but they have no foundation in truth. The size and shape of the teeth we have seen, are originally developed, and arrive at perfection long before the mental qualities are established, and the mind acquires its character.

But, though the teeth can have no apparent influence on the mental qualities of individuals, yet a considerable difference is visible in their appearance in the inhabitants of different countries; and, in this point of view, they may be considered indicative of the character of nations. Thus, the Spaniards are distinguished in general for their well arranged teeth. The Tartars, for their long and separated ones; and the Hottentots, for their extremely white ones.

Even the ideas of beauty, in respect to the colour of the teeth, differ in different countries. In Europe, and in civilized

society, the degree of whiteness constitutes their perfection. But, amongst savage tribes, black is preferred, in order to make them differ from the brute creation. Thus, the women of the Marian Islands blacken their teeth;—the same is done by the Tonquinese and Siamese, and by the inhabitants of Sumatra and Malacca. In Java, this distinction is confined to the married women, as a mark of greater respect; while, in the other parts of the East India Islands, the two central incisores of the upper jaw are often gilded, and the adjoining teeth made of a black colour.

In the East Indies, particularly in Hindoostan, the care of the teeth among the Bramins is made a part of their religious rites. As soon as they rise in the morning, their teeth are rubbed for an hour with a twig of the fig-tree. During this operation, their prayers are fervently addressed to the sun, invoking the blessing of heaven on themselves

and families. This practice, it is presumed, is coeval with their religion and government; and certainly nothing can shew their high regard for cleanliness, and particularly for the purity and beauty of the mouth, than by making it both a law and religious duty. The whiteness and regularity of the teeth seems to have been considered by their poets, as one of the principal charms of a mistress. Hence, the epithets of "sparkling teeth; teeth, white as the *cunda* blossom." In other places of India, the teeth are made of a reddish cast, by the constant use of the betel and areca nut. But not content with changing the natural form and colour of their teeth, many savage tribes try to make an alteration in the very shape of their mouths; and, by this means, the inhabitants of Prince William's Island, in the South Seas, appear at a distance to have two mouths. In order to do this, an incision is made in the under lip, in a line with the mouth,

sufficient to admit the tongue to pass through it, which, after being healed, continues to have all the appearance of lips. This artificial mouth is adorned with a shell, which is so cut, as to resemble a row of teeth.

These circumstances all conspire to prove, that the importance of the teeth is equally appreciated by all nations.

In civilized society, their care is regarded as a matter of fashion and ornament; and among the ruder nations, their preservation and cleanliness are enjoined as a religious duty, and their value so highly rated, as even at times to be offered in sacrifice to their deities.

Lavater has carried his whimsical system so far, as even to form from the teeth ideas of character in the brute creation. To the sea-horse, from the structure of his teeth, he gives the disposition of foolish, self-destructive malignity. To the sheep, he gives the character of little or no wildness, from

the line of the mouth, or form and position of the teeth. But, as we have already stated, it is not in the teeth, but on the countenance the great lines of character are exhibited. This is the theatre on which the soul delineates itself, and where the muscles of the face give it the expression of the inward workings of the mind. That countenance, which can at one moment display the most savage ferocity, or the greatest stupidity, will, on other occasions, exhibit the greatest meakness and placidity; and in all these circumstances, the teeth suffer no change. How unjust then to characterize all those who have irregular teeth, as possessing the most malignant passions; or to exclude from our friendship, all who have long and separated teeth, lest they should rob and murder us.

But though the teeth can have no influence in the elucidation of character, yet, in regard to appearance, their influence is great. No face can be consi-

dered as truly beautiful, which is disfigured by foul, unsound, or irregular teeth. The laugh, which is the test of good humour and openness, excites only disgust, where the mouth exhibits foulness and deformity. A pleasing countenance naturally prepossesses, but it never can be complete, unless beauty and regularity of the teeth unite in the attraction; so that where a person wishes to please, the care of the teeth forms an essential consideration: and hence, with justice, Lavater observes, that the form, position, and cleanliness of the teeth, so far as depends on the individual himself, is a certain proof of his taste in other matters.

CONCLUSION;

OR,

DOMESTIC ADVICE

ON THE

TEETH.

HAVING considered, at considerable length, the evolution, progress, and different diseases of the teeth; it only remains to point out to parents and guardians, how much the future health and beauty of their charge depend on their attentively watching over the changes that take place at different periods, in this part of the human structure.

It is a fact well known, and which

every one's experience daily confirms, that few persons pass through life, without more or less inconvenience from diseases of the teeth. In infancy, we have seen that their formation and growth is the source of great and constant anxiety to the fond parent; and that they produce deviations from health, which often continue for the remainder of life; for, at that early period, constitutional diseases are called into action by the irritation of dentition, which would otherwise have remained dormant.

But that period of childhood at which the temporary teeth begin to shed, is the critical time that calls for the attention of parents; for, by neglect at that time, irregularities are, as we have seen, apt to arise, which might easily have been prevented by proper care, and a due attention to cleanliness of the mouth.

The chief deformities produced by irregular teeth, are the rabbit mouth and

the projecting chin. But these and all other defects, may be prevented by timely attention.

The rabbit mouth is caused by a preternatural projection of the front teeth in the upper jaw, accompanied by a deformed irregularity in their arrangement; as exhibited at figure 1, in the frontispiece.

The projecting chin chiefly arises from a casual irregularity in the protrusion of the front teeth in the under jaw, which assumes an unnatural projection, while those of the upper jaw do not advance sufficiently forward, the direction of their points when in contact being contrary to what nature intended; for the incisores of the upper jaw are within, or on the inside of those of the under, instead of standing out beyond them; as shewn at figure 3, in the frontispiece.

In proportion as the teeth grow, the deformity becomes increased and more conspicuous; and so disagreeable is it,

that Physiognomists have attached to it a brutal disposition.

This instance is sufficient to shew, how much depends on domestic attention; for teeth that are too prominent or irregular, can always, by pressure made at an early period, be brought into their proper arrangement; so that it is not the means of cure that are wanting, but inclination in those concerned to apply them. That disagreeable appearance termed the rabbit mouth, is always in the power of the dentist to rectify; and what parent, who has a regard for the personal appearance of their offspring, would allow such a deformity to exist.

It is a truth, which most persons will admit, that before they have arrived at the years of maturity, disease has commenced in their second or permanent teeth; and it is for this reason they are induced to believe that the teeth are more easily destructible than the rest of the frame.

But this, we have endeavoured to prove, is a gross mistake; and that, on the contrary, the commencement of the diseases of the teeth arises from a want of that early and habitual cleanliness, which is the only means, as we have already pointed out, of preserving them.

This we have seen confirmed in the cases of the African and Indian, who, from constant care, preserve their teeth in perfect health.

Nothing, therefore, is required to render this part of the human structure less destructible than any other; but the same attention, which, from personal delicacy and fashion, is paid to cleanliness of the face and arrangement of the hair.

Nor should the teeth themselves be the only objects of care, the gums, or envelope which surrounds them, demand equal attention; and the character of a healthy state of the gums should be known to every mother. These cha-

racters are—a vermillion, or red colour —a close texture—their firmly embracing the necks of the teeth—and the gum forming projections in every interstice, and receding in front, so as to surround each tooth in the form of a small arch.

Where the gums, on the contrary, are pale and rough, their texture loose and flabby, and no adhesion takes place to the necks of the teeth, which are partly laid bare, it is but too apparent, that want of cleanliness and neglect have long existed, and disease of the teeth must already have occurred, or will soon follow.

To guard against this state, the early management of the teeth becomes the duty of the mother. As soon as the child is weaned, the task of cleaning the teeth should commence; every night and morning the mouth of the child should be washed, or rinsed out with warm water, the tongue wiped clean with a cloth, the teeth gently brushed,

and the waxed thread passed between them. This practice, so healthy and so conducive to comfort, will not only prevent all disease of the teeth and gums, but will also extend its beneficial effects in promoting the absorption of the fangs, and securing a regular arrangement to the future set.

Children, under such management, will be less subject to *catarrhal* affections, and sore throat, by the secretions of the mouth and throat proceeding in a regular and uninterrupted manner.

There is nothing which, in an after period, is so destructive to the health of teeth as the use of tooth-picks. They are usually formed of hard materials, and their insinuation between the teeth detaches the gums from their adhesion; and by laying the necks of the teeth bare, hollows or cavities are formed, which afford lodgements for the food, and proves a certain source of disease, and

the commencement of caries. The natural character of the gum is thus destroyed, their arched appearance vanishes and becomes flat, and inflammation succeeds.

The use, therefore, of tooth-picks is to be strongly condemned, whatever their form, or the materials of which they are made, and are as improper for children as for adults. When a pin is substituted, it is even more injurious than any other substance; for, by the wounds it makes, if the teeth are neglected, and tartar is allowed to accumulate, a putrid matter is inoculated into the gum, which renders it unhealthy and diseased.

We have already recommended the tongues of children to be cleaned with a towel, the same should be continued at every period of life, instead of the common instruments, termed tongue-scrapers, from the frequent use of which, and their mechanical operation on this

part, which naturally possesses great sensibility, much irritation is excited, and the organ becomes gradually injured, which lessens the powers of feeling, and thus destroys in a certain degree the sense of taste.

Nor is the use of tooth powders, though so much recommended, to be regarded in a more favourable light. In the manner in which they are employed, by acting on the periosteum, they detach and destroy that part of it which immediately surrounds the necks of the teeth, and thus occasions the loss of this useful and ornamental part of the human structure.

The same objection applies even to the constant use of tooth brushes, unless properly adapted, in their dimensions, to the corresponding dimensions of the teeth. This is a subject of very great importance, and has never been sufficiently or scientifically reflected on by dentists, consequently the rules they

have laid down for their use, have been highly erroneous, and often attended with injury, instead of answering any beneficial effect. It is clearly intended that a brush should only be applied to the surface of the tooth in order to remove tartar or other accumulation, but if it is made of such a size as to proceed further, it rubs upon the *periosteum* or investing membrane of the teeth; and thus, if daily used, cannot fail to destroy it, and the sooner if armed with tooth powder. This will shew the necessity for every person making a choice of a particular tooth brush for himself, selecting it according to the size of his teeth.

When children begin to shed their teeth, if irregularities form in their arrangement by over-lapping each other, a frequent inspection should take place; for all deformity can at that time be easily rectified, nor indeed is a cure of any deformity to be despaired of under

the age of fifteen. In bringing irregular teeth into their proper situation, it will be always preferable to extract one tooth, in order to give room for the rest, instead of using the file, which can never allow of so complete and natural an arrangement.

The most frequent and dangerous disease of the teeth, we have stated to be *caries;* this affects them at a very early period; indeed it is often coeval with their first irruption, particularly when dentition is slow, for then the accumulated matter is apt to lodge on their edges, and unless carefully removed, disease is entailed for life.

In every family, it should be a rule to have the teeth of children frequently inspected by a dentist; but there is an unfortunate prejudice entertained by parents, that his operations tend to injure the teeth. On this account, the proper time is often neglected, which occasions deformity and disfiguration of

the countenance for life. In many public seminaries this practice has been laudably followed. It will always prevent much future pain and regret; and children, when they attain the age of reason and reflection, will be more grateful for this attention, than for those accomplishments or indulgences which have no connection with health and comfort. The first traces of disease in the teeth are always unknown to the patient. *Caries*, in particular, is so insidious in its attack, that its existence often requires the most minute inspection of the dentist's eye to detect.

Whatever neglect may attach to the conduct of dentists in general, the one so commonly imputed to them, of dismissing their patients without the necessary instruction for preserving their teeth in the state of order to which they have been restored, is one, for which they certainly are not responsible. Why should they be blamed for withholding

that information of which they were never in possession? It being a fact, the public decision can sufficiently establish, that an attention to the interstices of the teeth, so much the object of the present work to recommend, is an improvement in the professional practice, which has hitherto wholly escaped their attention. The regular use of my dentifric apparatus, will however render any further instructions from the dental operator perfectly unnecessary.

Most dentists have an opinion that the teeth are sometimes too close to each other. But this can never be the case; for, in the closest set, there will be always room sufficient to pass the waxed thread in their interstices, provided there be no tartar to prevent it. Close teeth, on the contrary, have the advantage of affording a greater support to each other, and of causing a more general and firmer adhesion of the gum.

Among the popular prejudices which

have been sanctioned by dentists, is that of bad teeth being hereditary or running in families. This is a most erroneous idea, and ought to be strongly combated, as under such a prepossession the teeth will generally be neglected. Parents supposing that every means used for the prevention of disease will be fruitless.

I have no hesitation in affirming, that bad teeth are always accidental, and are to be considered either as the consequences of neglect, or improper management. This is confirmed by the appearance of the teeth in all animals but man; in the former we discover no diseased structure or other deformity, and therefore we are induced to ascribe it to fortuitous, not constitutional or hereditary causes. In favouring this opinion, dentists seem little aware how materially they injure themselves, and the discredit that is reflected on their own profession.

The use of the tooth brush we formerly stated, as only injurious when not

adapted to the size of the teeth, and acting too powerfully on the gums. With attention to this regulation, brushing the teeth is a most healthy and useful operation, provided no tooth powder is used, otherwise the ingredients of which it is composed will be liable to insinuate between the gum and periosteum, producing irritation and all its consequences. The period of shedding the first teeth, we have stated as the critical time for insuring to them regularity of arrangement, and beauty of appearance. It is at this time, the care of the dentist becomes indispensable, that the primary teeth, whose fangs are not absorbed, may be removed in time to prevent the permanent teeth acquiring any deformity, as well as to secure symmetry to the countenance, and harmony to the features.

The above observations have been dwelt on thus earnestly, from a wish to impress upon parents their serious im-

portance, to secure them from falling into improper hands, and to induce them to follow a system founded on reason and experience, eminently calculated for promoting the beauty and health of the human structure.

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